

# **Comparing Models for the Restoration of Essential Services during Counterinsurgency Operations**

**A Monograph  
by  
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## **Abstract**

**Comparing Models for the Restoration of Essential Services during Counterinsurgency Operations** by Major Anthony P. Barbina, United States Army, 76 pages.

What is the military's most effective model for restoring essential services during counterinsurgency operations? That question drove this monograph to compare the most popular restoration model, the SWEAT Model, against a new model, the Factor-Precedence Model. This monograph explains why the Factor-Precedence Model is more effective than the SWEAT Model for restoring essentials services during past, present, and future counterinsurgency operations.

Counterinsurgency operations include those military, paramilitary, political, economic, psychological, and civic actions taken by a government to defeat an insurgency. During counterinsurgency operations, restoring essential services, the infrastructure and supporting services that provide survival and comfort needs to the people, has become an important way to increase government legitimacy and decrease insurgent support. To leverage the positive impacts of essential services efforts, Department of Defense guidance and resource allocations require military forces to execute restoration of services and infrastructure. Because of the complex interactions required to restore essential services, counterinsurgency practitioners need an effective model to understand the environment, plan and analyze options, and conduct the work.

Military and civilian experts have produced many models to provide simple tools that help practitioners understand, prioritize, and execute essential services restoration. The SWEAT Model has become the most popular of these models because the SWEAT Model provides an easy way to think about infrastructure categories while conducting projects to improve those categories. Many units have used the SWEAT Model in Iraq and Afghanistan since 2004. As an alternative to the SWEAT Model, the author proposes a new model called the Factor-Precedence Model that develops processes for geographic and cultural evaluation of services, prioritization of requirements, and continuous assessment during essential services improvements. The Factor-Precedence Model leverages a whole of government approach to plan and execute improvements within the context of each area's needs.

This monograph assesses the effectiveness of the SWEAT and Factor-Precedence Models using two case studies and five comparison criteria: simplicity, flexibility, reproducibility, sustainability, and links to political and military objectives. In Case A, 1<sup>st</sup> Cavalry Division and its subordinate units used the SWEAT Model in Baghdad, Iraq (2005). Despite simple application and short term successes after implementation, the SWEAT Model used a cookie-cutter approach throughout Baghdad that limited analysis with regards to cultural, geographical, and regional factors. In Case B, 1<sup>st</sup> Cavalry Division and its subordinate brigades employed a model similar to the Factor-Precedence Model in Baghdad, Iraq (2009). 1<sup>st</sup> Cavalry Division's 2009 model applied a holistic outlook and focused on re-assessment, much like the Factor-Precedence Model, to allow for better analysis of needs, facilitate flexible execution across Baghdad, and permit project prioritization to meet local needs. To further evaluate the Factor-Precedence Model's usefulness, this monograph applies the Factor-Precedence Model within 10<sup>th</sup> Mountain Division's operational framework in Kandahar, Afghanistan (2010). The Afghanistan illustrative example shows the flexibility and applicability of the Factor-Precedence Model in not only varying geographical and cultural regions but also across the range of military operations.

Results matter. The Factor-Precedence Model provides the most flexibility, allows for execution in a variety of situations, and links better to military objectives. Military planners should adopt a holistic approach like the Factor-Precedence Model and integrate existing planning, intelligence, engineering, and analysis tools into the model. Further research can improve the application of the Factor-Precedence Model for other government agencies and can determine execution techniques during the range of military operations.

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# 1 – Introduction

*“Essential though it is, the military action is secondary to the political one, its primary purpose being to afford the political power enough freedom to work safely with the population... ‘A revolutionary war is 20 percent military action and 80 percent political’ is a formula that reflects the truth.”*<sup>1</sup>

- David Galula  
*Counter-Insurgency Warfare: Theory and Practice*, 1964

This monograph seeks to find the most effective model for restoring essential services during counterinsurgency operations. Although the restoration of essential services plays an important part in both major combat and humanitarian operations, this monograph will focus on restoration efforts and models used during counterinsurgency operations.<sup>2</sup> As David Galula, French counterinsurgency veteran of the Greek Civil War, Indochina War, and Algerian War, recognized in 1964, winning a counterinsurgency fight requires military organizations to apply military and nonmilitary instruments of power in support of the legitimate host nation government. As shown in historical American counterinsurgency operations, restoring essential services has become one of the primary nonmilitary instruments of power. To execute essential services restoration, military and civilian experts have developed a variety of useful models to help facilitate planning and shape operations. This monograph compares application of the military’s most popular restoration model, the Sewer, Water, Electricity, Academics, and Trash (SWEAT) Model, with a new model developed herein called the Factor-Precedence Model. The

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<sup>1</sup> David Galula, *Counterinsurgency Warfare: Theory and Practice* (New York, NY: Praeger, 1964), 89. David Galula, French military officer and scholar, proved influential in developing the theory and practice of counterinsurgency warfare in the late 1960s and early 1970s. Galula participated in or directly studied the Chinese Communist Revolution, the Greek Civil War, the Indochina War, and the Algerian War. His work’s popularity has surged since the 2006 version of *Field Manual (FM) 3-34 Counterinsurgency* cited his *Counterinsurgency Warfare: Theory and Practice* several times. This quote highlights the importance of kinetic and non-kinetic operations during counterinsurgency operations.

<sup>2</sup> Author’s Note: To focus the scope of this monograph, the analysis within focuses on models used during counterinsurgency operations. Restoring essential services may help forestall insurgency following major combat operations. Restoring essential services may also decrease human suffering and improve government effectiveness during humanitarian operations in the United States and overseas. Appendix 1 and 2 offer a comprehensive guide to the acronyms, terms, and definitions in this monograph.

monograph applies a case study framework that assesses both models in terms of five evaluation criteria: simplicity, flexibility, reproducibility, sustainability, and links to political and military objectives. By the end of this monograph, the reader should have a better appreciation of why essential services models exist and why the Factor-Precedence Model is more effective than the SWEAT Model, or other historical models, for restoring essential services during present and future counterinsurgency operations.

## **Organization**

This monograph includes seven main body sections and five appendices that compare the effectiveness of the SWEAT and Factor-Precedence Models. Section 1 of this monograph introduces the primary research question, provides background on essential services, and discusses the operational and intellectual impetus for the monograph. Section 2 conducts a literature review of the essential services debate and provides an overview of existing models. Section 3 provides an overview of the Army's most utilized essential services restoration model, the SWEAT Model. Section 4 describes the Factor-Precedence Model, a new model based in doctrine, adjusted through the lens of accepted theory, and refined through historical study. Section 5 outlines the case analysis framework and walks through the two similar case studies, set in Baghdad, Iraq, that portray use of the SWEAT and Factor-Precedence Models. Section 6 compares and analyzes the two Iraq case studies to determine the most effective model. The section then applies an illustrative example from Afghanistan that tests the applicability of the Factor-Precedence Model and facilitates inferences about future use and applications of the model. Section 7 concludes this effort by establishing recommendations for future actions and by proposing further research concerning the Factor-Precedence Model. The five appendices provide supporting information including definitions, acronyms, historical examples, model overviews, and a detailed explanation on how to use the Factor-Precedence Model.

## Background

The United States (U.S.) and its allies have a long history of conducting operations against insurgencies. According to David Galula's *Counterinsurgency Warfare: Theory and Practice*, insurgency is "a protracted struggle conducted methodically to attain specific intermediate objectives leading finally to the overthrow of the existing order."<sup>3</sup> Similar to Galula, *Army Field Manual (FM) 3-24 Counterinsurgency* defines insurgency as "[a]n organized movement aimed at the overthrow of a constituted government through the use of subversion and armed conflict."<sup>4</sup> Both definitions outline the fact that insurgents counter an existing government order and vie with that government for the support of the people. FM 3-24 logically nests with Galula's thoughts by describing counterinsurgency as "[t]hose military, paramilitary, political, economic, psychological, and civic actions taken by a government to defeat insurgency."<sup>5</sup> The critical lessons from Malaya, Algeria, and Vietnam counterinsurgency efforts outlined in Appendix 3 provide essential foundations for the counterinsurgency techniques in use today and inform practitioners how to effectively use non-military tools like the restoration of essential services.<sup>6</sup>

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<sup>3</sup> Galula, 4. Galula refined his definition of insurgency based on his experiences in Algeria combined with his detailed study of historical guerilla and insurgency movements. See Appendix 1 for more information on definitions and terms used throughout this monograph.

<sup>4</sup> United States (U.S.) Department of Defense, *U.S. Army Field Manual (FM) 3-24 / Marine Corps Warfighters Pamphlet (MCWP) 3-33.5, Counterinsurgency* (Washington, D.C.: Government Printing Office, 2006), Glossary 5. FM 3-24 cites Galula extensively throughout the manual showing the close connection between prevailing theoretical and doctrinal definitions for insurgency.

<sup>5</sup> Ibid., 1-1. Both Army and Joint doctrine define counterinsurgency as, the "[c]omprehensive civilian and military efforts taken to defeat an insurgency and to address any core grievances." As a note, practitioners often refer to counterinsurgency as COIN. See also U.S. Department of Defense, *Joint Publication 1-02, Department of Defense Dictionary of Military and Associated Terms*. Washington, D.C.: Government Printing Office, 2010, 108.

<sup>6</sup> Appendix 3, Modern Counterinsurgency Operations and Essential Services Key Events, provides a comprehensive list of key insurgencies and counterinsurgencies after World War II. Appendix 3 also highlights American involvement in the restoration of essential services during counterinsurgency operations since WWII.



This monograph focuses on the restoration of essential services. Essential services consist of the infrastructure and supporting services that provide survival and comfort needs to the people while sustaining life. Examples of survival and comfort needs generally include food, water, shelter, basic sanitation, and emergency health care. Essential service requirements vary by population density, historic norms and current state of infrastructure, geographic region and climate, and cultural context.<sup>7</sup> According to Army *FM 3-07 Stability Operations*, restoring essential services within regional context allows the host nation's government to increase support from the population and consolidate control in populated areas. During an insurgency, the people's needs and required government support become much more complex in part because the insurgents act to undermine or subvert the government's efforts to provide or restore essential services.<sup>8</sup>

The current models restoring essential services during counterinsurgency operations have evolved from British, French, and American counterinsurgency experiences over the last seventy years. Appendix 3 not only provides historical counterinsurgency experiences, but the appendix also provides context for modern American essential services efforts. Efforts to restore essential services ultimately contribute to achieving a stable democracy and a sustainable economy while improving the social well-being of the population.<sup>9</sup> This monograph focuses on the restoration of essential services within the context of counterinsurgency as opposed to major combat or nation-

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<sup>7</sup> U.S. Department of Defense, *U.S. Army FM 3-07, Stability Operations* (Washington, D.C.: Government Printing Office, 2008), 1-17. FM 3-07 provides a comprehensive relationship between population needs, government support, and effective counterinsurgency efforts. This monograph will expand on the geographical, cultural, and regional factors that influence essential services.

<sup>8</sup> FM 3-24, 3-11. According to FM 3-24, stabilizing a population requires meeting their needs. People pursue essential needs until they are met, at any cost and from any source. People support the source that meets their needs, whether those needs be security or physiological requirements. If needs provisions come from an insurgent source, the population is likely to support the insurgency. If the HN government provides reliable essential services, the population is more likely to support the government.

<sup>9</sup> *Ibid.*, 2-11. FM 3-07 proposes that during counterinsurgency operations, gaining support of the populace and increasing the legitimacy of the host nation government become the military's highest priorities. Military and diplomatic efforts in political, economic, and service areas compliment direct military actions.

building operations.<sup>10</sup> When attempting to restore essential services during an insurgency, counterinsurgents must find the model that provides the most effective representation of components, relationships, and dynamics for effective essential services restoration.

## **Operational and Intellectual Relevance**

While every military mission has unique circumstances, essential services restoration in a counterinsurgency environment challenges practitioners operationally and intellectually in ways important to this monograph. Evaluating the effectiveness of essential services models has usefulness to counterinsurgency's operational and intellectual debates. Operationally, the military has conducted essential services restoration missions in the past and will continue to conduct them in the future. The need for commanders and practitioners to have a solid tool to restore essential services has increased debate on the need for and use of effective models. Intellectually, debate continues concerning the definition of needs, procedures for evaluating geographical and cultural impacts, and potential techniques for prioritization and execution support. Understanding the operational and intellectual relevance of this monograph helps set the tone for the case studies and model evaluation.

### **Operational Relevance**

Essential services restoration presents a mission that has operational relevance to the Army's past, present, and future requirements. Militaries around the world have conducted counterinsurgency operations that included essential services restoration prior to World War II. As outlined in detail by Appendix 3, the restoration of essential services became even more important after World War II based on the increased importance of infrastructure on daily life and

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<sup>10</sup> James Dobbins, Seth G. Jones, Keith Krane, and Beth Cole DeGrasse, *The Beginner's Guide to Nation-Building* (Santa Monica: RAND Corporation, 2007), xxxiii. Major combat operations and nation-building establish a different set of initial conditions. Appendix 1, Definitions and Terms, provides a definition of nation-building. According to Dobbins and his co-writers, "[t]he prime objective of any nation-building operation is to make violent societies peaceful, not to make poor ones prosperous, or authoritarian ones democratic."

on the increased instability around the world. From Great Britain's counterinsurgency effort in Malaya to the America's efforts in Iraq and Afghanistan, history continues to demonstrate the relevance of essential services restoration and the need for effective ways to execute it.<sup>11</sup>

Historically, Army active duty, Reserve, and National Guard units have become involved in restoration operations regardless of force structures. In anticipation of future requirements, the Department of Defense has directed the military to plan for, support, and conduct essential services restoration during counterinsurgency operations. *Department of Defense Directive (DoDD) 3000.05: Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations* officially elevated stability operations to a "core" military mission on par with offensive and defensive operations and tasked the military to execute restoration of essential services tasks.<sup>12</sup> Government leaders also expect the military to support and restore essential services in specific, often dangerous, areas of operation because of limitations in Department of State's personnel capacity and security capabilities.<sup>13</sup> Based on the recurring theme and guidance to conduct essential services restoration, this monograph analyzes some of the most effective and holistic ways to do it.

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<sup>11</sup> See Appendix 3, Modern Counterinsurgency and Essential Services Key Events. Appendix 3 outlines the major insurgencies and counterinsurgency events since 1942. Each event has a timeline and historical relevance. Due to the detail available for American counterinsurgency and essential services efforts, citations for each event within Appendix 3 accompany the write up to facilitate additional research.

<sup>12</sup> U.S. Department of Defense, Department of Defense Directive (DoDD) 3000.05: Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations (DoDD 3000.05, November 28, 2005) (Washington, D.C.: Secretary of Defense for Policy, 2005), 1-2. DoDD 3000.05 directs military units to conduct stability operations outside the United States in coordination with other government elements and focus on tasks to "maintain or reestablish a safe and secure environment, provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief." See Appendix 1 for a more detailed definitions for stability operations, stabilization, infrastructure, reconstruction, and nation building.

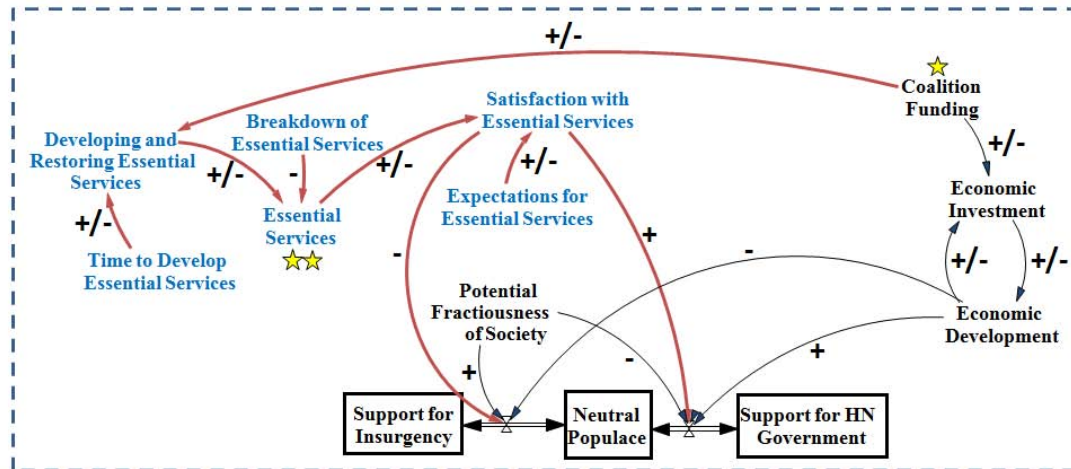
<sup>13</sup> FM 3-07, 2-11 – 2-12. FM 3-07 provides detailed guidance on supporting essential services as a primary logical line of operation and an Essential Stability Task in support of stability operations. The essential stability task matrix is an evolving interagency document to help planners identify specific requirements to support countries in transition from armed conflict or civil strife to sustaining stability. Military assets compliment other government agencies. In practical application, essential services may have its own line of effort. In other applications, units may make essential services a component of the governance, economics, or civil capacity lines of effort.

This monograph also has relevance to operational commanders because, besides being directed to execute essential services restoration, practitioners can gain support for the host-nation government and decrease support for an insurgency by improving essential services. FM 3-24 encourages counterinsurgents to not only fight insurgents but also to “use their capabilities to meet the local populace’s fundamental needs as well.”<sup>14</sup> Using the Systems Dynamic Model shown in Figure 1, U.S. Navy Captain Brett Pierson, a member of the Joint Staff’s Warfighting Analysis Division, modeled the historical connections between improvements in essential services and the influence on a neutral populace during counterinsurgency operations.<sup>15</sup> In areas where services suffered or where the insurgents successfully denied services to the people and blamed it on the government, counterinsurgents paid the price with less population support and less success. In areas where the legitimate government improved services and increased the population’s satisfaction with the provided services, counterinsurgents gained population support and had increased success. Based on Captain Pierson’s work and other needs-based studies linking positive outcomes with services improvement, the U.S. has increase the operational significance, resourcing, and support for essential services restoration during counterinsurgency efforts Since essential services prove operationally relevant and since the military has limited resources, time and expertise in essential services, counterinsurgents must develop effective ways to understand and improve services.

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<sup>14</sup> FM 3-24, 2-1.

<sup>15</sup> Brett Pierson, “A System Dynamics Model of the FM 3-24 COIN Manual,” 76th Military Operations Research Society Symposium (MORSS) (June 10-12, 2008) (Washington, D.C.: Warfighting Analysis Division, 2008) <http://www.mors.org/UserFiles/file/meetings/07ic/Pierson.pdf> (accessed on December 7, 2010), slide 16. According to Captain Pierson, Systems Dynamics Modeling provides a technique for modeling complex systems, framing issues, showing interdependencies, and portraying the impact of initiatives. Figure 1 graphically depicts the essential services and economic interactions during a counterinsurgency as well as the interaction’s impact on a neutral populace. Pierson’s analysis shows the effects of critical actions directed by Army FM 3-24’s population-centric approach.



#### Conclusions

- ★ An increase in Coalition funding will significantly impact the restoration of essential services.
- ★★ Improvements in the provision of essential services will increase or decrease satisfaction with essential services and will, in turn, positively or negatively influence the populace away from or towards the Insurgency or the Host-Nation Government.

**Figure 1: Mapping of Essential Services Impacts Using the Systems Dynamic Model<sup>16</sup>**

#### Intellectual Relevance

A key element of the intellectual debate balances the best techniques to restore services.

Based on the operational requirement to restore essential services, concerned commanders and counterinsurgency practitioners need a simple, yet effective, tool to overcome the lack of technical training and experience needed to conduct restoration tasks. A model describes "a set of abstract and general concepts and propositions that integrate those concepts into a meaningful configuration" of components, relationships, and dynamics.<sup>17</sup> The military uses a variety of

<sup>16</sup> Ibid. Figure 1 shows the author's recreation of Captain Pierson's Systems Dynamic Model. Captain Pierson's model depicts systematic connection between essential services, needs, expectations, and satisfaction related to the positive or negative impacts actions have on a neutral populace. The dotted boundary symbolizes the open nature of the counterinsurgency system where other factors and actions impact the neutral populace, insurgency, and host nation government. The arrows show connections between actions and outcomes. Pluses (+) denote a positive change or reinforcing relationship caused by one variable on the next. Minuses (-) denote a negative change or balancing relationship caused by one variable on the next. A plus and minus (+/-) denotes a relationship going either direction based on performance. Two critical counterinsurgent activities, economic investment and restoring essential services, greatly increase the support for the host nation government.

<sup>17</sup> Gordon L. Lippitt, *Visualizing Change Model Building and the Change Process* (Fairfax, VA: NTL Learning Resources, 1973), 2.  
<http://nationalforum.com/Electronic%20Journal%20Volumes%5CKritsonis,%20Alicia%20Comparison%20of%20Change%20Theories.pdf> (accessed on November 26, 2010). Lippitt's simple definition sets the tone for key elements of any model (components, relationships, and dynamics). Theoretically, a model can

flexible doctrinal, technical, or conceptual models that allow military members to deal with problems using a variety of techniques. In counterinsurgency model-making, the model usually describes an operational approach that shapes the language and conduct of operations.<sup>18</sup> During essential services restoration, models facilitate planning, analysis, and project selection and help non-technical experts make improvements without the years of training and experience technical provided to professions like engineering. Going without a model would remove an important tool for military and diplomatic practitioners.

In order to best employ limited resources, another important intellectual concern centers on the definition of needs in restoring basic services. The military's doctrinal definition for essential services allows for flexibility in interpretation among practitioners for what people truly need.<sup>19</sup> Due to the differences in geographical and cultural development seen throughout the world, the word *needs* means something different everywhere practitioners operate. According to the National Training Center's *SWEAT Smart Book*, engineers focus on the infrastructure, projects, and capacity improvement to meet needs.<sup>20</sup> According to the Department of State's Post-Conflict Reconstruction Essential Task List, Civil Affairs and Department of State personnel

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represent anything in the world, but models must meet certain criteria to remain effective. According to Lippitt, models must be clear, concise, simple, and flexible; See also George E. P. Box and Norman R. Draper. *Empirical Model-Building and Response Surfaces* (Wiley Series on Probability and Statistics) (New York, NY: John Wiley and Sons, Inc., 1987), 10.

<sup>18</sup> FM 3-24, 4-3. Paragraph 4-12 covers the techniques for model making and application during conduct (planning, preparation, execution, and assessment) of counterinsurgency operations. During the last nine years of combat operations in Iraq and Afghanistan, military and diplomatic leaders have used a variety of models for restoration of essential services during counterinsurgency operations.

<sup>19</sup> FM 3-24, 3-11. This section provides a general definition with supplemental information in Appendix 1. Doctrine for essential services provides little guidance in how to assess and meet the needs of the people to reinforce a host-nation government in a counterinsurgency environment.

<sup>20</sup> Operations Group Sidewinder Team, *SWEAT Smart Book: Practical Applications For Deploying Units Version 3.0*, Fort Irwin, CA: National Training Center (NTC), 2005. <http://www.irwin.army.mil/Units/Operations+Group/Sidewinder/default.htm> (accessed on August 28, 2010), 3. Engineers tend to focus on the structures and capacity to manage the structures. Key tasks for engineers include maintenance, construction, and repair for facilities and infrastructure.

focus on governance, economics, engagement, growth, and development to meet needs.<sup>21</sup>

Common vernacular and procedures coupled with an effective model could encourage inter-service and interagency approaches focused not only on projects but also engagements and development. To address the intellectual debate, the literature review in Section 2 helps to define essential services and explain existing approaches to the problem.

## **2 – Essential Services Literature and Restoration Models**

*“The long-term goal is to help develop indigenous capacity for securing essential services, a viable market economy, rule of law, democratic institutions, and a robust civil society... Many stability operations tasks are best performed by indigenous, foreign, or U.S. civilian professionals. Nonetheless, U.S. military forces shall be prepared to perform all tasks necessary to establish or maintain order when civilians cannot do so.”<sup>22</sup>*

*- Department of Defense Directive 3000.05*

As shown in Section 1 and the DoDD 3000.05 quote provided above, concerned commanders and counterinsurgency practitioners need an effective model based on valid theory and literature to conduct restoration work. Counterinsurgency authors have developed military and diplomatic theories to enable legitimate governments win a fight against insurgencies. Within those counterinsurgency theories rests an important principle of meeting constituent’s needs that contributes to this monograph. To meet population needs and ensure social well-being, the military has conducted operations to restore essential services. Educators, planners, consultants, and engineers have produced many models, to include the SWEAT Model, to provide simple tools that help practitioners understand, prioritize, and execute services restoration. Since 2004,

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<sup>21</sup> U.S. Department of State, Office of the Coordinator for Reconstruction and Stabilization, “Post-Conflict Reconstruction Essential Tasks (April 2005).” <http://www.crs.state.gov/index.cfm?fuseaction=public.display&shortcut=J7R3> (accessed on November 20, 2010), iii. In a very different outlook to the military, especially engineers, the Department of State connects the restoration of essential services with government and economic systems. Diplomats use this outlook to focus on dialogue, budgeting, the political process, and long term aspects of political development.

<sup>22</sup> DoDD 3000.05, 2. DoDD 3000.05 sets the tone for the importance and operational relevance of essential services to the military.

most units have used some form of the SWEAT Model in Iraq and Afghanistan to help them restore essential services and support the host nation government.<sup>23</sup>

## **Counterinsurgency and Essential Services Literature**

Counterinsurgency literature demonstrates how effective counterinsurgents fought against insurgents and provides the historical context for essential services restoration during counterinsurgencies. Since the early 20<sup>th</sup> Century, winning support of the populace has become a fundamental principle of both insurgency and counterinsurgency literature. In 1937, Chinese revolutionary, guerilla warfare strategist, political theorist, and leader of the Chinese Revolution Mao Tse-Tung wrote that “[b]ecause guerrilla warfare basically derives from the masses and is supported by them, it can neither exist nor flourish if it separates itself from their sympathies and cooperation.”<sup>24</sup> In 1952 during the Malayan Emergency, General Sir Gerald Templer, the British High Commissioner and commander of troops in Malaya, linked winning the “hearts and minds” of the Malayan people with improving popular perception and counterinsurgency success. In 1964, after taking part in the Algerian War as a French counterinsurgent, David Galula stated “the support of the population is as important for insurgents as it is for counterinsurgents.”<sup>25</sup>

Literature published since the beginning of America’s counterinsurgency operations in Afghanistan and Iraq carries the same emphasis on winning support of the population. Dr. Kalev Sepp, senior defense analyst at U.S. Naval Post Graduate School, discussed the importance of the population and the fulfillment of population needs to ensure satisfaction. Dr. John Nagl, former

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<sup>23</sup> Both Section 1 and Appendix 3 address the application of counterinsurgency and essential services efforts before and after 2004. Section 3 will provide additional information about the SWEAT Model and its use in Iraq and Afghanistan.

<sup>24</sup> Samuel Griffith, *Mao Tse-Tung On Guerrilla Warfare* (Baltimore, MD: The Nautical & Aviation Publishing Company of America, 1992), 71. Mao Tse-Tung, also Mao Zedong, wrote one of the first complete manuals on insurgency and guerilla warfare. Over the next ten years, he would execute his doctrine helping to establish the People’s Republic of China (PRC) after overthrowing the existing regime.

<sup>25</sup> Galula, 74.



military officer, co-author of the U.S. Army and Marine Corps Counterinsurgency Field Manual, and President for the Center for New American Security, outlined not only the population's importance during counterinsurgency operations but also covered how military units must establish learning organizations to adjust to changing population requirements.<sup>26</sup> FM 3-24 states that "[c]ounterinsurgents often achieve the most meaningful success in garnering public support and legitimacy for the host nation (HN) government with activities that do not involve killing insurgents."<sup>27</sup> Australian counterinsurgency expert, theorist, consultant, and author Dr. David Kilcullen exerted considerable influence on American counterinsurgency operations based on his role as the Senior Counterinsurgency Advisor to General David Petraeus in Iraq from 2007 to 2008. According to Dr. Kilcullen, counterinsurgents should focus on the pillars of counterinsurgency that support government legitimacy and provide for the people's needs.<sup>28</sup> A common idea among modern literature focuses on succeeding in a counterinsurgency campaign by meeting needs and providing basic services to the people in order to increase the host nation's legitimacy and increase chances of success.

Since meeting the population's needs proves important in counterinsurgency, literature outlining methods of meeting needs provides an important foundation for essential services restoration. Abraham Maslow, the American professor of psychology at Brandeis University who

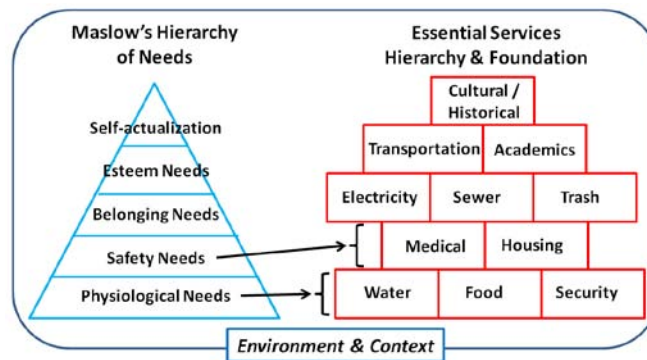
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<sup>26</sup> Kalev Sepp, "Best Practices in Counterinsurgency." *Military Review* (May-June 2005): 10. See also John A. Nagl, *Learning to Eat Soup With a Knife: Counterinsurgency Lessons from Malaya and Vietnam* (Chicago, IL: University of Chicago Press, 2005), 22.

<sup>27</sup> FM 3-24, 1-27.

<sup>28</sup> David J. Kilcullen, "Three Pillars of Counterinsurgency," Remarks delivered at the U.S. Government Counterinsurgency Conference on September 28, 2006, Washington, D.C.: Office of the Coordinator for Counterterrorism, 2006.  
[www.au.af.mil/au/awc/awcgate/uscoin/3pillars\\_of\\_counterinsurgency.pdf](http://www.au.af.mil/au/awc/awcgate/uscoin/3pillars_of_counterinsurgency.pdf) (accessed December 4, 2010), 4. Dr. Kilcullen, Australian counterinsurgency consultant, co-author of FM 3-24, and the Senior Counterinsurgency Advisor to General David Petraeus in Iraq from 2007 to 2008, placed many of these population-centric counterinsurgency designs into the 2007-2008 Iraq Campaign Plan and Counterinsurgency Policy. Based on the perceived success of the "surge's" approach, he taught his approach in Iraq to incoming commanders, including the author, and during conferences with the Army and Marines following his OIF experience.

founded humanistic psychology and created Maslow's Hierarchy of Needs, provides an excellent theory on human behavior, requirements, and perceptions. Maslow's Hierarchy of Needs has tremendous application in military doctrine because people generally understand his needs pyramid and the requirement to address needs in a population-centric counterinsurgency approach.<sup>29</sup> As depicted in Figure 2, the Maslow's Hierarchy of Needs pyramid on the left shows how humans generally attempt to fulfill the most important physiological needs because they relate to survival. Upon meeting those needs, they can progress up the pyramid to needs more associated with comfort and fulfillment.



**Figure 2: Maslow's Hierarchy of Needs and Essential Services Hierarchy<sup>30</sup>**

Because Maslow's studies covered a relatively homogenous group of healthy Americans, practitioners must combine the foundation provided by Maslow's Hierarchy of Needs with ideas

<sup>29</sup> Abraham H. Maslow, *Motivation and Personality, Third Edition* (New York, NY: Addison Wesley Educational Publishers, 1987), 15-22. Abraham Maslow provides the best and most commonly referenced outline of needs known as Maslow's Hierarchy of Needs. As shown by Figure 2, the requirements that form the bottom two sections of the pyramid establish the baseline standards for human physiological and safety needs. Maslow proposed that humans must meet basic needs then they gain motivation and access to progress higher on the hierarchy. According to FM 3-24 section C-7, military practitioners "must focus on meeting basic needs first, and then progress up Maslow's hierarchy as each successive need is met."

<sup>30</sup> Justin B. Gorkowski, "A Penny for Your Thoughts, a Nickel for Your Heart: The Influence of the Commander's Emergency Response Program on Insurgency" (Master's thesis, Naval Post Graduate School, 2009), 32. Figure 2 is the author's interpretation of Maslow's Hierarchy of Needs aligned against the categories of infrastructure and essential services. Although Maslow did not draw this pyramid in his own work, his detailed descriptions combined with the progressive nature of his hierarchy make the pyramid a popular interpretation of his ideas. Justin Gorkowski created a figure similar to Figure 2 in his work and compared it with needs of the Kirkuk Iraqis.

from other needs theorists to develop an essential services hierarchy.<sup>31</sup> Complementary analysis provided by Dr. Geert Hofstede and Dr. B.F. Skinner provide depth and context to Maslow's theory. Dr. Hofstede, the Dutch social psychologist, anthropologist, and pioneer in the research of cross-cultural groups and organizations, shows how diversity, geography, government, and economy impact the needs of a group or society.<sup>32</sup> Dr. Skinner, the influential American psychologist, behaviorist, author, and inventor, provides insight into the effects of cultural factors on group and societal needs.<sup>33</sup> Given impacts of geographical, cultural, religious context on societal needs, Figure 2 shows on the right side an essential services and infrastructure hierarchy paired with Maslow's Hierarchy of Needs. In this hierarchy, Naval Post Graduate School student Justin Gorkowski shows the foundational categories and relationships of infrastructure compared to human needs. The two hierarchies show that security becomes an influential force in essential services that may cause higher efforts on the pyramid to fail if security fails. If addressed in the correct context and completed in a relatively secure environment, providing services that support daily life and help people achieve an acceptable level of comfort should assist counterinsurgency practitioners. By connecting doctrinal definitions of essential services with needs-based theory, counterinsurgents can develop a valid categorization of essential services using existing essential services models.

As doctrine points out, the basic premise behind restoring essential services comes from meeting the needs of a population to prevent active or passive insurgent support. Any effective

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<sup>31</sup> Gambrel R Ciani, "Maslow's hierarchy of needs: Does it apply in a collectivist culture," *Journal of Applied Management and Entrepreneurship*, 8 (2003), 143.

<sup>32</sup> Geert Hofstede, "The Cultural Relativity of the Quality of Life Concept." *Academy of Management Review* 9 (July 1984): 389–398. <http://www.nyegaards.com/yansafiles/Geert%20Hofstede%20cultural%20attitudes.pdf> (accessed on November 20, 2010), 390. Hofstede took into account cultural and environmental factors such as power distance, masculinity, and that help add to the utility of Maslow's work.

<sup>33</sup> B.F. Skinner, *Science and Human Behavior: Behaviorism*. (New York, NY: The Free Press, 1953), 9-10. Skinner focused on environment, conditioning, and learning curves associated with cultural norms.

model must assist practitioners in providing population needs while connecting services delivery with the legitimate government. As shown previously in Figure 1, Captain Pierson, like many counterinsurgency authors, outlines the requirements to correlate meeting needs and expectations with increasing government legitimacy.<sup>34</sup> For the purpose of this monograph, relating needs identified in popular theories, literature, and practice with accomplishing military and political objectives helps determine the most effective essential services model.

Literature connecting defined needs with counterinsurgency outcomes provides a critical foundation for military restoration models. Meeting the needs of people can have a great impact on state security and defeating insurgents. Although the military focuses heavily on violence reduction and security improvement as measures of effectiveness, the connection between essential services improvement and changes in violence levels requires additional study outside the scope of this monograph.<sup>35</sup> The debate in essential services literature has not become whether or not to restore essential services but rather how to restore them. Counterinsurgency doctrine focuses the application of essential services restoration in support of government legitimacy using a population centric approach. FM 3-24 outlines essential services as a separate logical line of operations that concentrate on “providing those things needed to sustain life.”

The RAND research team of Dr. Todd Helmus, Dr. Christopher Paul, and Dr. Russell Glenn provide compelling evidence that the population centric approach may help prevent deterioration in states bordering on civil violence. They propose that American forces can use stability operations and essential services projects to encourage civilian behavior.<sup>36</sup> Their study states that projects may be allocated or strategically withheld based on adherence to U.S.

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<sup>34</sup> Pierson, 7 and 16.

<sup>35</sup> The effect of specific restoration actions or projects on violence levels exists outside the scope of this monograph. On-going systems and mathematical modeling studies by the United States Military Academy Department of Systems Engineering may help to refine ideas on this topic in the future.

<sup>36</sup> Todd Helmus, Christopher Paul, and Russell Glenn. *Enlisting Madison Avenue: The Marketing Approach to Earning Popular Support in Theaters of Operation* (Santa Monica: RAND Corporation, 2007), 139.

operational norms. FM 3-07 states that “[t]he greatest threats to our national security will not come from emerging ambitious states but from nations unable or unwilling to meet the basic needs and aspirations of their people.”<sup>37</sup> To leverage this technique, practitioners must clearly support the government, identify expectations of the population, and provide that information to the population concerning changes and improvements.<sup>38</sup>

## **Current Essential Services Models**

The operational requirements to restore essential services and the need for models to help understand, prioritize, and execute services restoration have produced multiple models, with the SWEAT Model being the most highly utilized and covered in doctrine. The military uses models to break down problems into visual and understandable parts, facilitate communication between groups, and allow for more effective application of resources. Models help get things “about right” but cannot precisely predict every case. The greatest common factors among military models include keeping concepts simple and allowing maximum flexibility to commanders in the field.

During the last nine years of combat operations, military and diplomatic leaders have searched for the most effective model for restoration of essential services during counterinsurgency operations. In 2004, Marine and Army units began using the SWEAT acronym because restoration operations had no coverage in doctrine or mainstream models.<sup>39</sup> By the end of

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<sup>37</sup> FM 3-07, vi. People who do not have their needs met look to alternate sources like insurgents or alternate organizations that may have hostile intentions towards the U.S.

<sup>38</sup> Ibid., 50. Helmus, Paul, and Glenn encourage the use of civilian and military rewards to highlight the benefits of popular compliance. Focus by the authors on the incentive nature of such projects is critical and they go on to warn of the potential danger if insurgent groups become familiar with the process and deliberately take action to deny aid.

<sup>39</sup> Alexander Fullerton and Garth Myers, “Fitting into the Fight – An Engineer’s Dream From a Brigade Troops Battalion S3,” *Small Wars Journal* (2009). Richmond, VA: Small Wars Foundation LLC, 2004. <http://smallwarsjournal.com/blog/journal/docs-temp/221-fullerton.pdf> (accessed on January 25, 2011), 4-5.

2004, several Marine and Army units in Iraq, including the subject of Case A, Multi-National Division – Baghdad (MND-B), employed essential services models focused on SWEAT.<sup>40</sup> In early 2005, the National Training Center (NTC) developed the first essential services restoration model and handbook called the *SWEAT Smart Book: Practical Applications for Deploying Units Version 3.0*. The *SWEAT Smart Book* helped train units on infrastructure reconnaissance and assessments prior to deployments. Also in 2005, a team from the U.S. Military Academy’s (USMA) Departments of Systems Engineering and Mathematical Sciences developed the models covered in the *Infrastructure Assessment Methodology*. Colonel (Dr.) Joe Manous and his team provided an operations research-based model that contributed several critical categories and prioritization techniques to later versions of the SWEAT Model.<sup>41</sup>

After a few years of model experimentation in the field, the first essential services model entered doctrine in 2006. In the 2006 version of FM 3-24, and later in the 2008 versions of FM 3-07 and FM 3-34.170, doctrine built on the structure of models from the National Training Center and Army Engineer School to create the “Infrastructure Assessment and Survey Model.” Also known by practitioners as the SWEAT Model because it spells out the acronym SWEAT-MSO, the Infrastructure Assessment and Survey Model remains the only essential services model in doctrine and has considerable use among units. Following his work at West Point as an instructor, Major Travis Lindberg introduced the *Critical Infrastructure Portfolio Selection Model (2008)*.

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<sup>40</sup> Dawson Plummer, “Examining the Effectiveness of SWET and the Sons of SWET in OIF.” (Master’s monograph, School for Advanced Military Studies (SAMS), Command and General Staff College, 2007), 30. Plummer’s SAMS monograph shows both Marine and Army application in late 2004. He reviews the different versions of the SWEAT family of acronyms that units have developed over time including SWEAT, SWEAT-MSO, SWET-H, SWET-MS, and others. Plummer calls the SWEAT family of acronyms the “sons of SWEAT.”

<sup>41</sup> Travis Lindberg, et al., *Infrastructure Assessment Methodology*, 73<sup>rd</sup> Military Operations Research Society Symposium (MORSS) (21-23 June 2005) (West Point, NY: Department of Systems Engineering United States Military Academy, 2005), 12. Dr. Manous led the team, but then-Captain TJ Lindberg provided the briefing and outlined most of the research data. The team developed “checklists” to support the assessment, built models based on American domestic infrastructure, and then inferred values for host-nation infrastructure in the Theater of Operations (TO) effort.

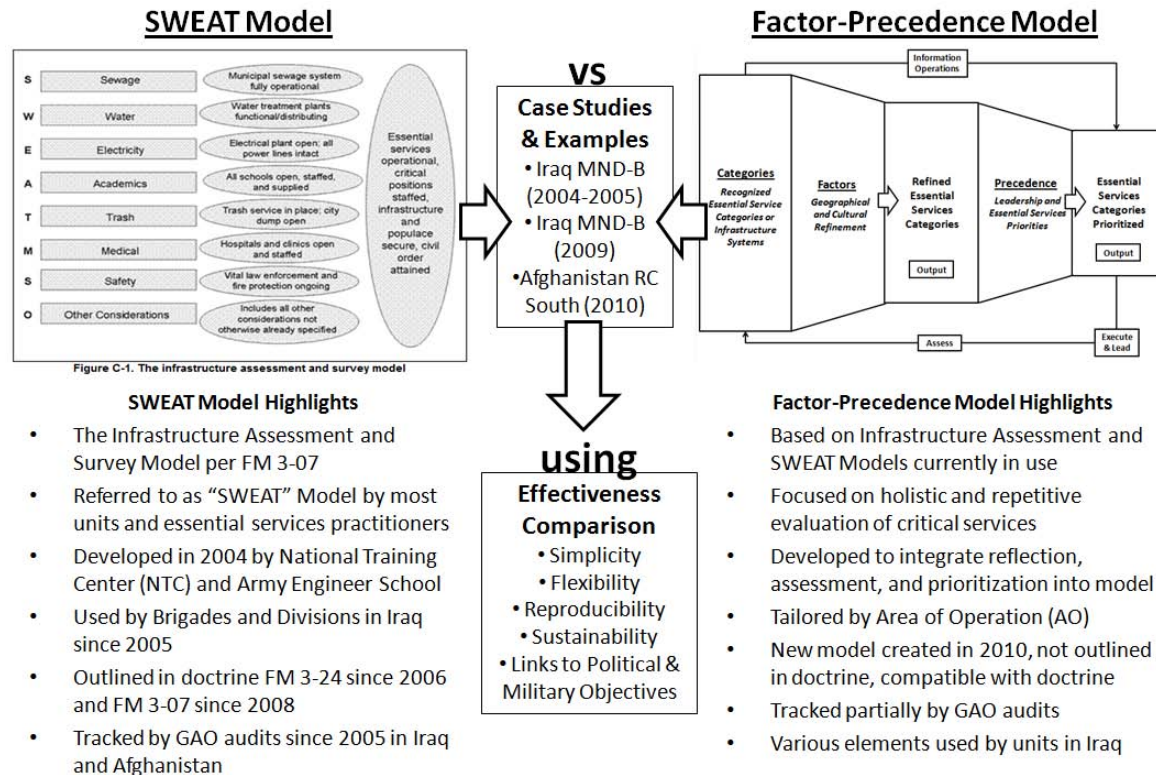
This model highlighted critical distinctions between categories and infrastructure purposes. The intent behind Lindberg's models focused on increasing infrastructure security, conducting infrastructure assessments, and completing repairs or re-building to support the achievement of short and long term security goals.<sup>42</sup> In 2010, Professor Dr. John Farr and a small team from USMA traveled to Afghanistan and developed a model for the Department of State in Afghanistan called the *U.S. Embassy (Kabul) Value Model and Project Analysis Tool*.<sup>43</sup> This new model establishes an excellent association between projects and government objectives that had little coverage in doctrine and previous models. Because the model focused on budgeting and action, the tool focused heavily on projects as opposed to holistic assessments of the situation. Appendix 4, Current Essential Services Models, provides more details on popular models including a brief history of each with example pictures.

Despite having several models available, the existing model that has the greatest impact on modern counterinsurgency operations remains the doctrinal SWEAT Model. The ease of use and widespread application of the model made the SWEAT Model the perfect candidate for analysis in this monograph. Using the key lessons and strengths of existing models, this monograph considers the newly created Factor-Precedence Model, which provides an approach that leverages basic needs assessment, establishes basic categories for evaluation and action, and works through project prioritization. Sections 3 and 4 describe the SWEAT Model and the Factor-Precedence Model, respectively, in more detail. Figure 3, Model Comparison Approach, outlines the comparison approach used throughout this monograph.

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<sup>42</sup> Travis Lindberg, "The Critical Infrastructure Portfolio Selection Model" (Master's thesis, Command and General Staff College, 2008), iii.

<sup>43</sup> John V. Farr and Brian D. Sawser, *US Embassy (Kabul) Value Model and Project Analysis Tool* (West Point, NY: Department of Systems Engineering, 2010), 'Intro' Tab and 'How to Use' page. The program provided useful context for individual project impact and project prioritization techniques.



**Figure 3: Model Comparison Approach<sup>44</sup>**

### 3 – The SWEAT Model

*“A direct correlation existed between the level of local infrastructure status, unemployment figures, and attacks on U.S. Soldiers... The choice was to continue to attrit through direct action or shape the populace to deny sanctuary to the insurgents by giving the populace positive options through clear improvement in quality of life.”<sup>45</sup>*

- Major General Peter W. Chiarelli  
Commander, 1<sup>st</sup> Cavalry Division  
*Military Review*, 2005

Early in U.S. counterinsurgency efforts in Afghanistan and Iraq, leaders like the commander of 1<sup>st</sup> Cavalry Division, Major General Chiarelli, identified the improvement of

<sup>44</sup> Author’s Note: Figure 3 provides a graphical representation of the comparison technique used in this monograph. Using three modern examples compared against five comparison criteria, this monograph attempts to determine the most effective model during a counterinsurgency. Section 3 and 4 will present an in-depth review of each model and will expand on the highlights shown in Figure 3.

<sup>45</sup> Peter Chiarelli and Patrick Michaelis, “Winning the Peace: The Requirement for Full Spectrum Operations.” *Military Review* (Jul-Aug 2005): 4–17, 10. Major General Chiarelli makes a solid case for the relationship between status of infrastructure and essential services and insurgent support by the populace.



essential services as a key factor in defeating insurgency because it increases support to the legitimate government. As highlighted in Section 2, essential services restoration led to creation of various models to help practitioners understand and improve services. Section 3 provides an overview of the most utilized model, the SWEAT Model, which Army Doctrine describes in FM 3-34.170.<sup>46</sup> To allow for real-world execution, practitioners supplement doctrine with non-doctrinal tools and products like the *SWEAT Smart Book*.<sup>47</sup> Using on this precedent, the SWEAT Model evaluated in this monograph supplements the doctrinal model with Army Engineer School and National Training Center products.

The Army's doctrinal SWEAT Model focuses on infrastructure assessments, data collection, project prioritization, and execution as a way to restore essential services across the lines of effort *SWEAT-MSO*. As shown in Appendix 3, the SWEAT Model emerged after years of the Army conducting essential services restoration during and after combat operations. Tracing fundamental roots to Vietnam-era programs called the Hamlet Evaluation System (HES) and Civil Operations and Revolutionary Development Support (CORDS), the SWEAT Model leverages civilian and military institutions to improve host-nation government services.<sup>48</sup>

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<sup>46</sup> U.S. Department of Army and U.S. Marine Corps, *U.S. Army FM 3-34.170/MCWP 3-17.4 Engineer Reconnaissance* (Washington, D.C.: Government Printing Office, 2008), C-1. FM 3-24, FM 3-07, and FM 3-34.170 all cover important aspects of the Army's SWEAT Model. FM 3-34.170 shows the SWEAT Model as a way to think about categories of projects and support.

<sup>47</sup> *SWEAT Smart Book*, 3. The National Training Center's (NTC) *SWEAT Smart Book* provides an effective training tool for engineers and SWEAT practitioners. The majority of deployed units have received training on one or both of the essential service support products. *The SWEAT/IR Book* provides excellent references for reconnaissance, assessments, and prioritization. See Appendix 4 for additional information on both products.

<sup>48</sup> See Appendix 3 for additional information on historical programs and services models. Although HES and CORDS form some of the early roots to infrastructure assessment, reconnaissance, and repair, this monograph will focus only on the relationship between essential services models and the Vietnam-era HES and CORDS programs.

By 2004, units like Major General Chiarelli's 1<sup>st</sup> Cavalry Division used his SWEAT Program to guide the essential services effort.<sup>49</sup> Using field feedback from units like 1<sup>st</sup> Cavalry Division and combining it with engineering theory, the National Training Center Engineering Team (Sidewinders) developed the first major model for restoration of essential services. NTC not only provided this manual across the military community, NTC teams trained most engineer, civil affairs, and essential services practitioners on the *SWEAT Smart Book* during their training at Ft. Irwin. The Engineer School described the Infrastructure Reconnaissance and Improvement Model in the 2005 document called *The SWEAT/IR Book*.<sup>50</sup> Because it had proprietary photos and information inside the book, *The SWEAT/IR Book* earned an earmark of For Official Use Only (FOUO) that limited the books distribution and impact on the Army. By 2006, the Army had published its first doctrinal essential services restoration model in FM 3-24, which referred to the model as the Infrastructure Assessment and Survey Model. This model outlined the key elements of essential services and focused practitioners on the acronym and memory aid, *SWEAT-MSO*.<sup>51</sup> According to the *SWEAT Smart Book*, units began calling the doctrinal model the SWEAT Model based on the memory aid and in honor of the hard work required to make progress in essential services.<sup>52</sup> Because the infrastructure categories that make up the acronym SWEAT do not always provide the infrastructure solution that a commander needs, the engineer school

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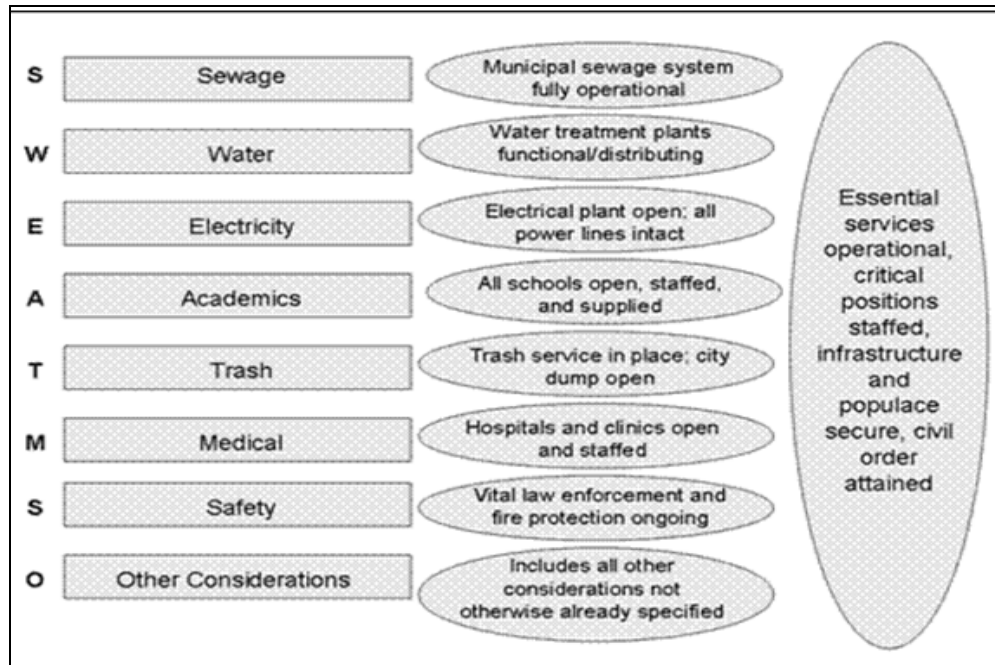
<sup>49</sup> Chiarelli and Michaelis, 9. The first fully documented use of the SWEAT Model in a counterinsurgency environment came from the *Military Review* article written by Major General Chiarelli and MAJ Patrick Michaelis. The article and division history also refer to the program as "sewage, water, electricity, and solid waste" with a minor concentrations on "hospitals, schools, communications, and emergency response networks."

<sup>50</sup> FM 3-34.170, C-1. Like doctrine, the United States Army Engineer School (USAES) would rather practitioners call the SWEAT Model by the name Infrastructure Reconnaissance to prevent units from focusing too narrowly on sewage, water, electricity, academic, and trash (SWEAT) categories. In their own words, units currently use SWEAT because "SWEAT is a great acronym. It has caught on and is in widespread use." FM 3-34.170 provides a detailed discussion on the infrastructure reconnaissance and assessment process.

<sup>51</sup> FM 3-07, 4-11. SWEAT-MSO stands for sewage, water, electricity, academics, trash, medical, safety, and other considerations.

<sup>52</sup> *SWEAT Smart Book*, 5.

recommends thirteen “Other” categories for infrastructure support. Figure 4 shows the SWEAT Model used to integrate and synchronize tactical actions, delineate roles and responsibilities, and focus the civil-military efforts in pursuit of related objectives. The following paragraphs provide a brief explanation of the SWEAT Model to facilitate a common understanding.



**Figure 4: The Infrastructure Assessment and Survey Model (aka SWEAT Model)<sup>53</sup>**

## Infrastructure Categories and Assessment

The first step of the SWEAT Model requires units to conduct an infrastructure reconnaissance and assessment of existing essential services. The basic services or categories evaluated depend on the situation, mission, and commander’s intent. NTC’s *SWEAT Smart Book* and the United States Army Engineer School’s (USAES’s) *The SWEAT/IR Book* provide supplemental references to FM 3-34.170 that outline objectives required to restore essential

<sup>53</sup> FM 3-34.170, C-1. FM 3-34.170 provides doctrinal guidance for engineer reconnaissance across the full spectrum of operations. The manual introduces engineer technical reconnaissance support and infrastructure reconnaissance. Doctrine officially names the essential services restoration model the ‘Infrastructure Assessment and Survey Model’ but recognizes that most practitioners call it the ‘SWEAT Model.’ The doctrinal SWEAT Model provides a basic understanding of the essential services categories, conditions, and end states required for success. Doctrine provides key tasks required in a typical restoration landscape and expects practitioners to use engineering references and smart books to increase effectiveness.

services. The refinement of infrastructure categories increases the availability of data on SWEAT requirements and helps focus counterinsurgents on the allocation of resources to specific, unprioritized infrastructure categories like sanitation, energy, and agriculture. During the first step, units can ask questions like those in Figure 5 to refine information and understanding of the essential services situation. Infrastructure reconnaissance not only identifies the problems. These questions and the supplemental reconnaissance guides outlined in doctrine provide the relevant information necessary for planning and reconstruction by those skilled in an appropriate specialty.<sup>54</sup>

- **Sewage.** What is the status of the local sewage system? What health and environmental risks exist?
- **Water.** What potable water sources are available? Are they adequate? Have they been tested?
- **Electricity.** What is the status of electrical generation facilities to include availability of generators? What is the status of the transmission infrastructure? What critical facilities to include hospitals, government buildings, and schools are not having their needs met? What is the availability of fuel for transportation, heating, and cooking? Is there an adequate system of distribution?
- **Academics.** What schools are in need of repair and rebuilding?
- **Trash.** Is there a system in place for removing waste? What hazardous waste streams are being generated that may have detrimental impacts on health and the environment? What is the ultimate disposal system for trash?
- **Medical.** Are medical services available and operational? Does an emergency service exist? Are services available for animals?
- **Safety.** Is there a police and fire service? Are UXO or other EHs an issue?

Figure 5: FM 3-34.170 Category Refinement Questions<sup>55</sup>

## Essential Services Planning, Objectives, and End States

The second step of the SWEAT Model focuses on the establishment of essential services objectives and end states. After reconnaissance and assessment determine the state of infrastructure, the essential services planning process establishes a feasible road map for action and the best path for improvement. As shown in Figure 4, this path establishes specific tasks,

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<sup>54</sup> U.S. Department of the Army, *U.S. Army FM 3-0 Operations* (Washington, D.C.: Government Printing Office, 2008), 6-7. Commanders and staffs analyze civil considerations in terms of the categories expressed in the memory aid ASCOPE (areas, structures, capabilities, organizations, people, and events). Civil considerations help commanders develop an understanding of the social, political, and cultural variables within the area of operations and how these affect the mission.

<sup>55</sup> FM 3-34.170, C-2.

requirements, or objectives for each infrastructure or service category. Both the *SWEAT Smart Book* and *The SWEAT/IR Book* provide useful tools to link assessments with objectives that improve infrastructure.<sup>56</sup> Based on the progression of tasks and objectives during the unit's time in the area, practitioners establish required conditions that qualify the achievement of the commander's end state – they describe what the end state will look like to the host nation. Units plan prioritized projects and infrastructure improvements to increase services, meet emergent needs, and reach the end state for essential services.

### **Project Prioritization, Execution, and Transformation**

The third step of the SWEAT Model provides the platform for practitioners to prioritize their requirements, execute projects, and establish the foundation for long term development. According to the *SWEAT Smart Book*, SWEAT practitioners evaluate each infrastructure category and prioritize actions based on the level of effort required, health concerns, cost, local perception, local involvement, government impact, and interdependence of the structure.<sup>57</sup> Based on priority of need, the SWEAT Model leverages the prioritization of resources and projects to improve unit focus in the counterinsurgency environment.<sup>58</sup> Units execute projects within the SWEAT Model to provide support to governance, economic, and essential services lines of operation. During execution, units track measures at the level of their partnership with host-nation government employees. Since 2005, the Government Accountability Office (GAO) has conducted audits and

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<sup>56</sup> *SWEAT Smart Book*, 108-112. The assessment and measurement techniques provided by the *SWEAT Smart Book* outlined measuring service levels using the green, amber, yellow, black system. The infrastructure category tables provide a description of status. Based on the assessed status of infrastructure, practitioners can establish required tasks or objectives needed to reach long-term objectives.

<sup>57</sup> *Ibid.*, 120 (References). The *SWEAT Smart Book* focuses on use of resource and project prioritization to meet unit objectives. The general criteria of effort, health and safety, cost, local perception, self-governance, and infrastructure interdependence help units and commanders understand local needs and develop their final prioritization. The *SWEAT Smart Book* credits the United States Military Academy with developing the exact same categories. "The United States Military Academy has developed criteria to assist the commander in determining the prioritization of infrastructure within his area. The following are general criteria to assist the commander and his staff."

<sup>58</sup> *Ibid.*, 3-5.

surveys to track essential services improvements at the national level in Iraq and Afghanistan. Both local and national assessments help monitor improvements, track spending, adjust development plans, and understand on-going transformations in essential services.

In conclusion, the three steps of the SWEAT Model allow practitioners to improve essential services within their time and resource constraints. The doctrinal SWEAT Model focuses on linear improvement over specific lines of effort to meet objectives. The doctrinal model provides no provisions for re-assessment, but commanders and practitioners using the Battle Command Process will conduct continuous evaluation and assessment during operations. The SWEAT Model, when complemented by the *SWEAT Smart Book* and *The SWEAT/IR Book*, becomes a powerful tool for analysis and action. It focuses on action through project execution and host-nation capacity building.

## 4 – The Factor-Precedence Model

*“A victory is not [just] the destruction in a given area of the insurgent’s forces and his political organization. It is that, plus the permanent isolation of the insurgent from the population, isolation not enforced upon the population but maintained by and with the population.”<sup>59</sup>*

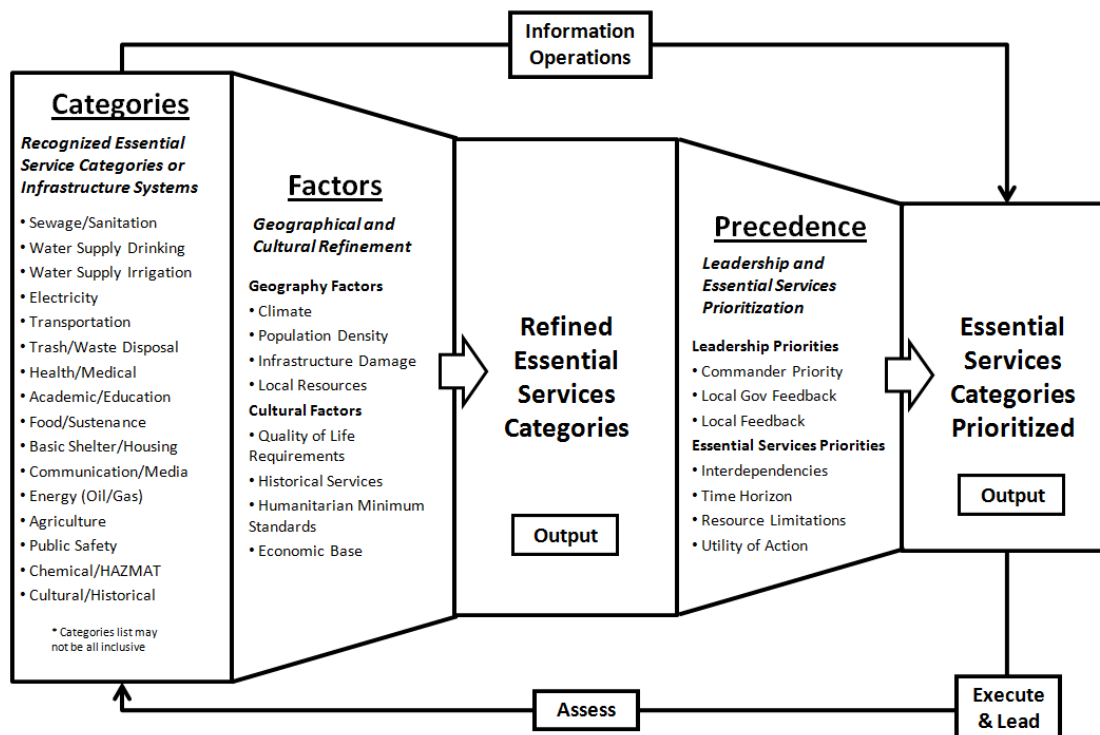
- David Galula  
*Counterinsurgency Warfare*, 1964

David Galula understood the need for the host nation community to be involved in the planning and performance of the work in order for it to be of lasting impact. The author of this monograph created the Factor-Precedence Model in August 2010 to provide a more holistic approach to restore essential services by working with the local government and through local people to accomplish military objectives. This section provides an overview of the Factor-Precedence Model, a straight-forward model that complements existing counterinsurgency doctrine and incorporates existing tools. Appendix 5 provides a specific, more comprehensive description of how to apply the Factor-Precedence Model.

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<sup>59</sup> Galula, 54-56.

As shown in Figure 6, the structure of the Factor-Precedence Model consists of sixteen general infrastructure categories that constitute essential services and are common to every global region. Each essential service category represents a service or infrastructure system that provides for the needs of the population. The Army Engineer School and Army doctrine have detailed and refined these categories over the last six years. As a result, practitioners and intelligence specialists understand how to analyze and assess these service systems.<sup>60</sup>



**Figure 6: The Factor Precedence Model**

Using eight local geographical and cultural factors, the Factor-Precedence Model focuses the existing categories into a manageable list that better represents the needs of the local population. The output of this step reduces to four to seven refined categories that allow practitioners to define essential services lines of effort and provide recommendations for category objectives and end states to their leadership. Using this abbreviated list, units then apply

<sup>60</sup> FM 3-34.170 / MCWP 3-17.4, 170 and C-2.

leadership and resource guidance to relate prioritization to both categories and individual projects. Because essential service requirements differ in every geographic location, cultural setting, and unit area of operation, an effective restoration model must first narrow recognized service categories, then allow practitioners to prioritize those selected categories and projects for execution and assessment. Figure 6 shows the Factor-Precedence Model aligned with its complementary tasks of information operations, execution, leadership, and assessment.

## **Recognized Essential Service Systems or Categories**

The first step in the Factor-Precedence Model requires units to analyze the sixteen recognized essential services categories. These categories, ranging from sewage to shelter, provide the required infrastructure to support basic needs for a culturally acceptable quality of life. Appendix 5, *How to Apply the Essential Services Factor-Precedence Model*, provides a brief explanation of each of these categories. Using the general infrastructure categories recognized by the engineering and international communities, practitioners gain a better understanding of the physical infrastructure and systematic connections. Governments typically align their bureaucratic system to support the sixteen categories with ministries assigned to major areas. Career fields, like engineering, focus on these specific categories for technical licensure and expertise over the life of a career. Because of widespread use, most military units and leaders understand the existing categories and can ascertain initial requirements for action.

Existing tools such as geospatial databases, operational variables analysis, and civil considerations analysis allow the unit to better understand the services system.<sup>61</sup> Infrastructure reconnaissance and assessment of each service category facilitates further application of the Factor-Precedence Model and detailed coverage is provided in *FM 3-34.400 General*

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<sup>61</sup> U.S. Department of the Army, *U.S. Army FM 5-0 The Operations Process* (Washington, D.C.: Government Printing Office, 2010), 1-5 and C-7. Operational variables, PMESII-PT, and civil considerations, ASCOPE, represent tools that allow commanders to understand and visualize the battlefield. Both variables provide valuable information on essential services.



*Engineering*, Appendix C.<sup>62</sup> The analysis of essential services categories establishes a solid baseline for unit intelligence preparation and for government engagement along bureaucratic lines. Essential services reconnaissance, assessment, and analysis also set conditions for the model's second step.

## **Geographical and Cultural Factors**

The second step of the Factor Precedence Model allows units to apply local geographical and cultural factors in order to trim categories to actionable levels. Both geographic and cultural factors force practitioners to think more holistically about the requirements and impact of essential services on the community. The eight geo-cultural factors refine general categories into something specific to a company, battalion, brigade, division, or higher unit's area.<sup>63</sup>

Geographical factors filter climate, population density, extent of battle damage, and availability of local resources in order to analyze local weather, terrain, and progress conditions. Cultural factors filter quality of life requirements, historical services, humanitarian minimum standards, and the economic base to focus on local needs, desires, and expectations.

Units gain geographical and cultural information during pre-deployment research, environmental analysis, and during initial reconnaissance. Units then refine these geo-cultural factors using tools such as area and infrastructure assessments, the Engineer Research and Design Center's (ERDC's) *Geo-Cultural Analysis Tools (GCAT)*, and Human Terrain System assessments based on local engagements.<sup>64</sup> The second step of the Factor-Precedence Model

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<sup>62</sup> U.S. Department of the Army, *U.S. Army FM 3-34.400 General Engineering* (Washington, D.C.: Government Printing Office, 2008), Appendix C. Appendix C provides a complete explanation of rating systems and category color coding based on outcomes of the engineer technical assessment.

<sup>63</sup> Author's Note: Factor in this monograph literally means 'who or which acts' and highlights the importance of using geography and culture to filter the basic essential services into a refined focus. In the Factor-Precedence model's application, factors differ from area to area, but subordinate units should nest their analysis with conclusions and guidance from their higher headquarters.

<sup>64</sup> Dan A. Morrison, *Geo-Cultural Analysis Tool™ (GCAT)*. Remarks and presentation delivered at the U.S. DoD Modeling and Simulation (M&S) Conference in Orlando, FL on March 10, 2008.

outputs four to seven essential services categories on which counterinsurgents can concentrate their efforts for each area of operation. Planners subsequently define the lines of effort (LoE), decisive points, objectives, and end states for each category. Appendix 5 provides a list of examples concerning application of the geo-cultural factors.

## **Leadership and Mission Precedence Elements<sup>65</sup>**

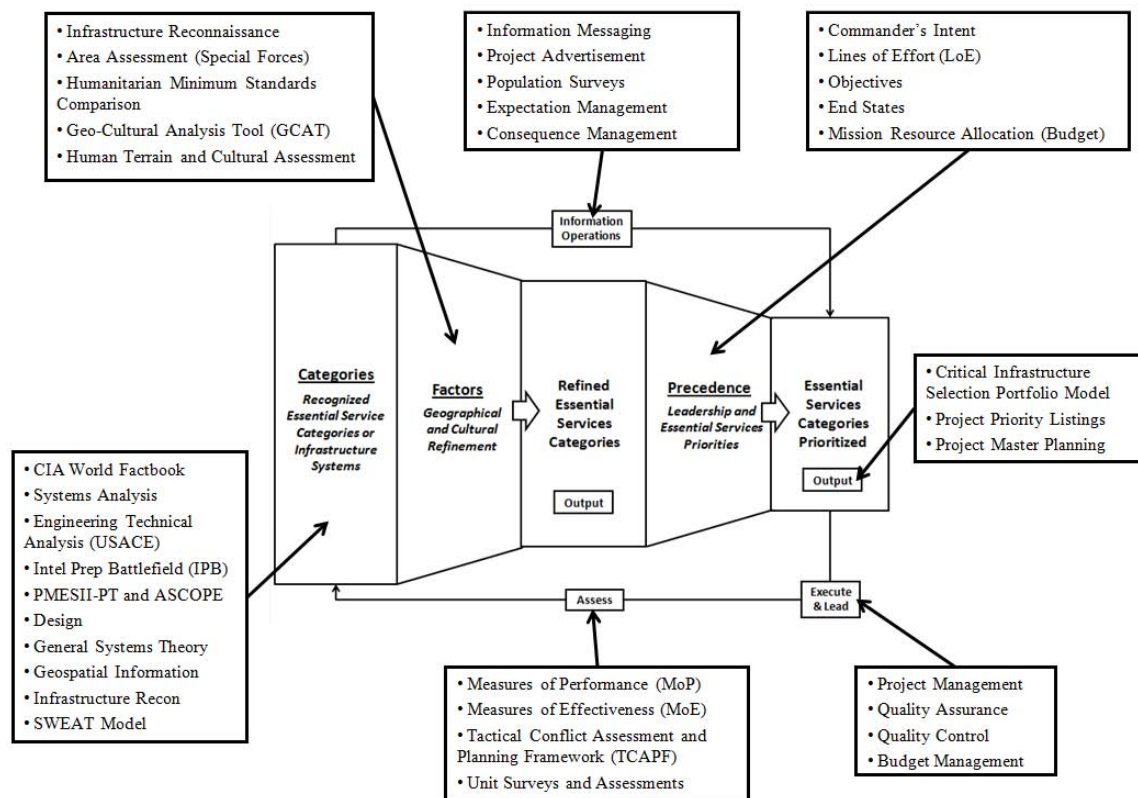
The third step in the Factor-Precedence Model allows units to apply elements of their leader's guidance and essential services technical priorities. Using the refined categorization from the second step, counterinsurgents must utilize elements of precedence to rank order essential service operations and projects. During most military operations, limited time or resources require the commander to prioritize focus and effort before, during, and after operations. Leadership priorities provide focus based on the unit commander's intent and guidance, feedback from concerned government officials, and feedback from local consumers. Essential services priorities tailor the systematic interdependencies, time and resource limitations, and utility of action to balance priorities in terms of wants and needs. Priorities differ within every area based on basic service status, resources available, unit goals, and capabilities of the government entities. The third step of the Factor-Precedence Model outputs a final prioritization that governs specific actions within categories and individual projects to ensure effective and efficient execution of localized essential services operations. Adjustments to funding, resources, or commander's intent can shift the precedence of refined categories. Due to the long-term nature of essential service operations, units should keep adjustments to the minimum necessary.

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Champagne, IL: U.S. Army Research & Development Center (ERDC), 2008, 26. In 2008, ERDC proposed a complete *Geo-Cultural Analysis Tool (GCAT)* to "put people back into the picture, put socio-culture in its place on the map."

<sup>65</sup> Author's Note: Precedence in this monograph literally means the condition of being considered more important than someone or something else; priority in rank; the right to precede in order, rank, importance, or priority.

The effectiveness and flexibility of the Factor-Precedence Model in terms of location, interchangeability, and compatibility demonstrate that the model could work in future counterinsurgency operations. Figure 16 portrays the interaction of the Factor-Precedence Model with many existing tools used by essential services practitioners. Appendix 5 provides a list of examples concerning application of precedence elements and provides model links to complementary actions like information operations, execution, leadership, and assessment.



**Figure 16: Existing Tools and Applicability to the Factor-Precedence Model<sup>66</sup>**

In conclusion, the three steps of the Factor-Precedence Model allow practitioners to integrate essential services restoration with the Battle Command Process. The Factor-Precedence Model focuses on holistic improvement within the geographical, cultural, and leadership environment to improve essential services and defeat the insurgency. The integration of

<sup>66</sup> Author's Note: The Factor-Precedence Model can easily accommodate use of and interaction with all of the programs, models, tools, and techniques listed in Figure 16.

provisions for reassessment and information management should help practitioners to continuously develop improvement plans and manage operations.

## 5 – Iraq Case Studies

*“The answer lies not in pouring more troops into the jungle, but in the hearts and minds of the Malayan People.”<sup>67</sup>*

- General Sir Gerald Templer,  
Director of Operations and High Commissioner for Malaya, 1952

*“Military force cannot change opinion. It can only create a framework in which economic reform and government can take effect.”<sup>68</sup>*

- Major Bill Tee, 1/6 Gurkha Regiment  
British District War Executive Committee, 1953

### Case Evaluation Framework and Model Effectiveness

The quotes by General Sir Gerald Templer and Major Bill Tee, both British leaders during the Malaya Emergency, illustrate the importance of the defense units working outside narrow security roles by expanding military efforts in social, economic, and government areas. This monograph uses two primary cases from Iraq to compare the effectiveness of the SWEAT and Factor-Precedence Models in situations similar to that faced by General Templer and Major Tee. Case A, Operation Iraqi Freedom in 2005, offers an example in which 1<sup>st</sup> Cavalry Division applied the SWEAT Model to essential services operations. Case B, Operation Iraqi Freedom in

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<sup>67</sup> David J. Kilcullen, “Counterinsurgency in Iraq: Theory and Practice, 2007,” *Small Wars Center of Excellence Counterinsurgency Seminar 07 (CS 07 – 26 September 2007)*, Quantico, VA: Marine Corps Warfighting Laboratory, 2007. Report written by Mr. David Dilegge. <http://smallwarsjournal.com/documents/COINSeminarSummaryReport.doc> (accessed on December 4, 2010), 53. David Kilcullen provides this direct quote in his presentation. See also John A Nagl, *Learning to Eat Soup With a Knife: Counterinsurgency Lessons from Malaya and Vietnam* (Chicago, IL: University of Chicago Press, 2005), 91. Under Templer, the British developed a successful counterinsurgency doctrine that their military used throughout the rest of the campaign. Templer instilled his emphasis on innovation and honest assessment throughout the British Army in Malaya. Templer’s efforts allowed the British Army to adapt to the insurgents over the following years.

<sup>68</sup> Nagl, 101. Major Bill Tee, an army officer working with Templer in Malaya, noticed positive impacts of working military and political agendas together to provide water, electricity, and other essential services in areas where security forces set the right conditions.

2009, offers an example where 1<sup>st</sup> Cavalry Division applied an essential services model very similar to the Factor-Precedence Model during their counterinsurgency operations.

The case evaluation framework begins with five evaluation criteria that help establish a set of important factors for all effective models.<sup>69</sup> The five evaluation criteria of simplicity, flexibility, reproducibility, sustainability, and links to political and military objectives provide a comparison framework. The evaluation criteria derive from the works of three theorists, Paul Davidson Reynolds, John Lewis Gaddis, and Antoine Bousquet. These theorists have established the primary requirements for evaluation of theories and models. The evaluation criteria draw a comparison between the two models and facilitate inferences from case study analysis by addressing those factors that increase chances of success and those that can cause failure. With slight modifications, these criteria help evaluate model effectiveness within the case studies as outlined in Table 1.<sup>70</sup>

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<sup>69</sup> Author's Note: The author served during Operation Iraq Freedom (OIF) from 2007 to 2009 in one of MND-B's subordinate units, 2/25 Stryker Brigade Combat Team (SBCT). Although the Factor-Precedence Model did not exist at the time, the 1<sup>st</sup> Cavalry Division deviated so much from existing SWEAT Models and focused so heavily on assessments, reconnaissance, holistic prioritization, and constant re-evaluation that the 2009 case study provides a framework for showing key elements of the Factor-Precedence Model. The military's use

<sup>70</sup> Author's Note: The Army also uses evaluation (eval) criteria to compare feasible courses of action (COAs) during the detailed planning process known as the Military Decision Making Process (MDMP). The case evaluation framework builds on both political science's comparative politics methodology and the Army's course of action evaluation criteria to compare the SWEAT Model and the Factor-Precedence Model. More details on the evaluation criteria follow in Table 1.

**Table 1: Model Effectiveness and Evaluation Criteria Definitions**

<b>Eval Criteria Short Title</b>	<b>Evaluation Criteria Definition</b>	<b>Sources</b>	<b>Measure &amp; (Benchmark)</b>
<b>Simplicity</b>	Simple enough approximation of the real world that American diplomats and Soldiers can understand and apply the model during counterinsurgency operations	- Reynolds <sup>71</sup>	- Number of categories in use (# categories) - Useful to wide spectrum military force (Infantry, Civil Affairs, Engineers, etc)
<b>Flexibility</b>	Flexible models allows for deliberate and hasty model application through a variety of initial conditions and environmental situations	- Reynolds <sup>72</sup> - Gaddis	- Speed capability (fast & slow) - Diversity in areas supported (agricultural, industrial)
<b>Reproducibility</b>	Reproducible models provide a systematic methodology that allows for application to past and present cases and for execution in nearly any future situations	- Gaddis <sup>73</sup> - Bousquet	- Applicable to past cases (Vietnam) - Applicable to current cases (Iraq, Afghanistan) - Useful for future results (Hybrid threat)
<b>* Sustainability</b>	Sustainable models build on past experience, last over time, transform with changing environments, and tie well into planning and execution tools (e.g. can locals sustain the output?)	- Bousquet <sup>74</sup>	- Useful in multiple environments (urban, rural) - Existing tools applicable to model (# applicable) - Immediate vs. long-term perspective (both present)
<b>** Links to Political and Military Objectives</b>	Effectively linked models support political and military objectives by applying a holistic approach to informed military thinking in a counterinsurgency environment (e.g. cost vs. benefit linked militarily and politically)	- Bousquet <sup>75</sup> - Military doctrine	- Nested with higher HQ guidance and objectives - Cost vs. Benefit of action (Measures) - Integration with variety of ministerial or civil service branches (# ministries)

<sup>71</sup> Paul Davidson Reynolds, *A Primer on Theory Construction* (Boston, MA: Allyn & Bacon, 1971), 135. According to Reynolds, keeping things simple remains an important part of effective theory or models. He stated that, “[t]wo ‘easy’ concepts may be considered ‘simpler’ than one ‘difficult’ concept.”<sup>72</sup> John Lewis Gaddis, *The Landscape of History: How Historians Map the Past* (New York, NY: Oxford University Press, 2002), 79. According to Gaddis, effective models adapt to sensitive or fast changing initial conditions. Most establish common categories then applying screening factors to situations.

<sup>72</sup> John Lewis Gaddis, *The Landscape of History: How Historians Map the Past* (New York, NY: Oxford University Press, 2002), 79. According to Gaddis, effective models adapt to sensitive or fast changing initial conditions. Most establish common categories then applying screening factors to situations.

<sup>73</sup> Gaddis, 107-108. Gaddis wrote that reproducibility means that repeated application of a model or theory to past, present, and future cases will match closely with reality. Effective models for essential services must match not only the past, but they need to predict with some level of certainty the future.

<sup>74</sup> Antoine Bousquet, *The Scientific Way of Warfare*. (New York, NY: Columbia University Press, 2009), 21. a model or scientific discourse’s “ability to transform radically its constitutive theories and frameworks while still claiming a single corpus and methodology. It is this ability to remould [sic] itself that has secured science’s lasting legitimacy as the central authoritative discourse in the Western World.”

<sup>75</sup> Ibid., 4. Linking “The scientific way of warfare therefore refers to an array of scientific rationalities, techniques, frameworks of interpretation, and intellectual dispositions which have characterised [sic] the approach to the application of socially organised [sic] violence in the modern era.”<sup>76</sup> Catherine Dale, *Operation Iraqi Freedom: Strategies, Approaches, Results, and Issues for Congress – RL34387*. Washington, D.C.: Congressional Research Service, 2009. <http://www.fas.org/sgp/crs/mideast/RL34387.pdf> (accessed on January 25, 2011), 140.

Although restoration of essential services presents a very complex situation, an effective model provides a simple approximation of the real world that American diplomats and Soldiers can understand and apply during counterinsurgency operations. Flexible models allow for deliberate and hasty application across a variety of initial conditions and environmental situations. Reproducible models provide a systematic methodology that allows for application to past and present cases and for execution in nearly any future situation. Sustainable models rely on past experiences as a foundation on which to build. These models last over time, adapt to changing environments, and integrate well into planning and execution tools. Not only do sustainable models facilitate repeated use of the model itself, but they also encourage outcomes that practitioners can pass on to others. In terms of essential services model sustainability, the critical question becomes “can the local people, leadership, or government sustain this project?” Effectively linked models support political and military objectives by applying a holistic cost-benefit approach to informed military thinking in a counterinsurgency environment. Table 1 provides a complete definition, theoretical foundation, and measure for each of the five evaluation criteria.

By selecting two similar case studies that occur in the same area, with the same combat unit, and under the same central government and supporting ministries, this case analysis generally controls the comparison framework between past and present restoration operations. In both cases, leadership took into consideration the experience of their force, the technical capacity available for missions, and available opportunities when selecting the appropriate restoration model. Similarities between cases support the appraisal of each model’s effectiveness using the five evaluation criteria. Table 2 provides an overview of the primary similarities between Case A and Case B that facilitate direct comparison.

By selecting two case studies with minor differences including the time period, surge effects, Iraqi government capability, and violence levels, this case analysis incorporates adequate controls that differentiate the specific capabilities for each model. As shown in Table 2, the eight

minor differences between the two cases link the two similar situations and facilitate comparison of actions and outcomes. The implementation of a new counterinsurgency approach by General Petraeus and his theater command, Multi-National Forces – Iraq (MNF-I), combined with the increased experience of the combat and technical experts, has significant impacts when compared to the 2005 case. As many practitioners on the ground have pointed out, by the time of the 2009 surge, force leaders, staff, commanders, and troops in the field typically brought with them significant previous Iraq experience to the mission. Most leaders and commanders have served at least one previous tour in Iraq, and their familiarity with Iraqi governing structures, basic laws, and customs is markedly greater than the limited knowledge the first coalition teams brought to the Baghdad, Iraq case. However, the differences still facilitate comparison between the two cases.<sup>76</sup>

**Table 2: Cases A and B Comparison Controls**

Case Similarities	Case Differences
<ul style="list-style-type: none"> <li>- Area &amp; Time of Year (Geography and cultural breakdown)</li> <li>- Established Central Government</li> <li>- Central government services (Ministries, Civil Service)</li> <li>- Religious apportionment (Shia and Sunni split)</li> <li>- Division in command (MND-B)</li> <li>- Detailed unclassified command reports available (1 CAV)</li> <li>- Detailed 3rd party audit information available (SIGIR and GAO)</li> <li>- Essential services conditions (Damage pre-surge, limited maintenance)</li> <li>- Resourcing priority and support (Pre-OEF Surge)</li> <li>- Focused on non-lethal operations</li> <li>- Command focus on essential services</li> <li>- Engineer technical forces (MND-B and USACE)</li> <li>- Iraqi government revenues (Oil Prices ~ \$75/barrel)</li> </ul>	<ul style="list-style-type: none"> <li>- Time period (2005 and 2009)</li> <li>- Surge effects (Forces redeployed in early 2009) *</li> <li>- Violence levels (2009 half of 2005 levels) *</li> <li>- New COIN focus from MNF-I (General Petraeus, Ambassador Crocker, and Dr. Kilcullen)</li> <li>- People with more experience (Combat, Technical)</li> <li>- Different leadership focus (Provincial Reconstruction Teams [PRTs] available, Department of State priority and resource allocation)</li> <li>- Iraqi government more capable (Capacity growth) *</li> <li>- Doctrine and essential services models (Updates)</li> </ul> <p>* Differences minimal and facilitate case comparison</p>

<sup>76</sup> Catherine Dale, *Operation Iraqi Freedom: Strategies, Approaches, Results, and Issues for Congress – RL34387*. Washington, D.C.: Congressional Research Service, 2009. <http://www.fas.org/sgp/crs/mideast/RL34387.pdf> (accessed on January 25, 2011), 140.



## Case A: SWEAT Model in Baghdad, Iraq (2005)

### Case Context and Unit Approach

In Case A, the context for 1<sup>st</sup> Cavalry Division's operations in Baghdad evolved from the initial combat focused invasion of Iraq in 2003 into stability operations focused on government and infrastructure reconstruction by 2005. Operation Iraqi Freedom (OIF) began on March 20, 2003 with an invasion by a multinational coalition led by the U.S. military. Following a speedy completion of major combat operations that climaxed in the overthrow of Saddam Hussein's regime, the Coalition and allied Iraqi forces established a Coalition Provisional Authority (CPA) to rule Iraq, assist in reconstruction, and set conditions for a "transfer of sovereignty" back to a legitimate Iraqi government. By June 2003, Combined Joint Task Force 7 (CJTF-7) assumed control of the military component of operations and focused on the political (governance), economic, essential services, and security lines of operation.<sup>77</sup> Amid a growing trend in violence and an emerging insurgency in 2004, the CPA transitioned authority to the Interim Government of Iraq.<sup>78</sup>

To support the Interim Government by late 2004, CJTF-7 reorganized into a joint, combined force known as MNF-I and began managing combat operations throughout Iraq.<sup>79</sup>

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<sup>77</sup> Ibid., 62. CJTF-7 planned to lead the security line and provide support to CPA efforts in other areas. Almost immediately, CJTF-7 began fighting a stronger-than-expected Iraqi insurgency. These lines of operation, also called categories of effort at the time, evolved greatly over time as leaders and commanders in the field interacted with decision makers in Washington, D.C. In the absence of a comprehensive reconstruction plan, dialogue continued about the best ways to achieve security and while improving the complex lines of politics, economics, and essential services.

<sup>78</sup> Ibid., 32-42. The new U.S. Embassy, led by Ambassador John Negroponte, had no direct rule requirements from the CPA. Instead, the Iraq Embassy only had only responsibility for representing American interests and coordinating efforts with the military. See also, Chiarelli and Michaelis, 6. Throughout 2004, Marine attacks in Fallujah, just west of Baghdad, and militia leader Muqtada al-Sadr's grass roots movement in Baghdad's Sadr City cause increased violence and spillover issues in the streets of Baghdad. The insurgents deftly placed blame for the "lack of power" squarely on the impotence of the fledgling Iraqi Government and supporting coalition forces, citing the historical truth of power always being available under the Saddam regime.

<sup>79</sup> Ibid., 48-49. To support and partner with the military components of the Interim Government of Iraq, MNF-I gained command and control responsibility for the Multi-National Corps-Iraq (MNC-I), also located in Baghdad. MNC-I became the operational-level headquarters reporting to MNF-I and had

After a review of the military strategy at the end of 2004, the MNF-I Commander concluded that the Iraqi civilians all over the country wanted and needed basic essential services restored or even created. To jump start the rebuilding process, MNF-I distributed funds called Commander's Emergency Relief Program (CERP) Funds to U.S. Coalition Forces for projects and local support.<sup>80</sup> Focus on reconstruction and funding for local projects helped set the context for this case study. The U.S. Coalition commanders directed their maneuver operations to disrupt the enemy and used non-maneuver capabilities like the restoration of essential services to assist the local population.

To narrow more closely into the subject of Case A, 1<sup>st</sup> Cavalry Division took command and control in April 2004 of Task Force Baghdad, also called Multi-National Division – Baghdad (MND-B).<sup>81</sup> Through their relief in place in February 2005, the MND-B's operational campaign plan balanced five integrated conceptual lines of operations (LOOs) shown in Figure 7: 1) conducting combat operations, 2) training and employing security forces, 3) promoting essential services, 4) establishing a capable, legitimate government, and 5) creating opportunities for economic independence through a free market system.<sup>82</sup> Each LOO had a close relationship with

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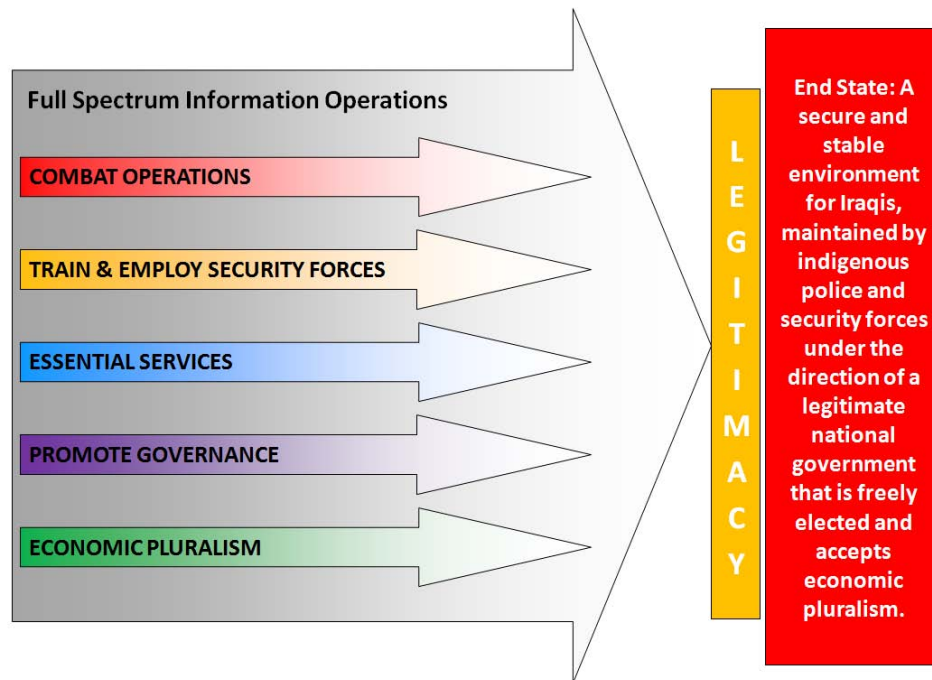
responsibility for synchronizing coalition forces actions throughout Iraq. The overall strategy focused on defeating insurgents and terrorists conventionally. Then, Coalition Forces could eliminate unconventional support to the enemy from the local population while increasing legitimacy of the Iraqi government.

<sup>80</sup> Frederick Barton and Bathsheba Crocker, *Progress or Peril? Measuring Iraq's Reconstruction* (Washington, D.C.: Center for Strategic and International Studies, 2004), 52. Reconstruction of infrastructure had progressed slowly after the invasion. Problems with corruption, increasing demand, and unreasonably high expectations of coalition forces ability to immediately provide services decreased population support for the Iraqi government and American counterinsurgency support. Combat battalions, along with their Iraqi district and city engineer counterparts, identified many shortfalls and projects. Until ERP became available, they lacked the funds and manpower to execute improvements.

<sup>81</sup> Steven C. Draper, 1<sup>st</sup> Cavalry Division Museum Director, "1<sup>st</sup> Cavalry Division History - GWOT History." Fort Hood, TX: 2010 1<sup>st</sup> Cavalry Division Museum. <http://www.hood.army.mil/1stcavdiv/about/history/gwot.htm> (accessed on January 25, 2011), 2-5. Mr. Draper provided a variety of unclassified documents outlining the efforts and accomplishments of 1<sup>st</sup> Cavalry Division in 2005. Upon taking command in Iraq, the division gained direct control of more than 39,000 uniformed members and 62 battalions of active duty, reserve, and National Guard Soldiers, Marines, and international coalition partners.

<sup>82</sup> Chiarelli and Michaelis, 7. According to Major General Chiarelli, the Division engaged in multiple lines of operations simultaneously to defeat the enemy and win the support of the Iraqi people.

information operations (IO) that communicated positive messages to the Iraqi populace, international community, and American base. With improvement in each line, the Task Force planned to meet the end state, or ultimate goal, of building a legitimate Baghdad government while shifting the city away from instability.<sup>83</sup>



**Figure 7: Task Force (TF) Baghdad (1<sup>st</sup> Cavalry Division) Lines of Operation (LOO)<sup>84</sup>**

A major part of the instability in Baghdad came from the difference between conditions in 2004 compared with conditions during Saddam Hussein's reign over Iraq. During Saddam's regime from 1979 to 2003, Hussein focused much of his government funding and support to the capital region. Baghdad received fifty percent of the available power despite having only thirty percent of the populace. Saddam built drinking water, trash collection, and irrigations systems in

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Combat Operations, Train & employ Security Forces, Essential Services, Promote Governance, and Economic Pluralism) while mutual supporting, were discrete, the sixth – Information Operations.

<sup>83</sup> Bruce Pirnie and Edward O'Connell, *Counterinsurgency in Iraq (2003-2006)* (Santa Monica, CA: RAND National Defense Research Institute, 2008), 41-42.

<sup>84</sup> Chiarelli and Michaelis, 6. Figure 7 shows the author's recreation of Major General Chiarelli and TF Baghdad's lines of operation (LOO). General Chiarelli established his LOOs to focus his forces on securing and stabilizing the Iraqi environment to facilitate a legitimate, freely elected city government that accepts economic pluralism. Essential services would become a major part of Chiarelli's Campaign Plan.

and around Baghdad that far surpassed the quality of those in the rest of the country. Following the coalition invasion, many of these formerly well off Iraqi neighborhoods now had no potable drinking water, continuous electrical blackouts, no evidence of trash collection, high unemployment, and a genuine mistrust of the newly formed Iraqi government. The \$30 billion in aid and development spent in the two and one-half years after the end of major combat operations focused on country-wide electrical and water projects that did little to change the situation on the ground, especially in Baghdad.<sup>85</sup>

### **Essential Services Operations and the SWEAT Model**

To support the six million people in Baghdad, 1<sup>st</sup> Cavalry Division focused immediately on the line of operation for essential services as the “first among equals.” When NTC and the Army Engineer School published their SWEAT books, the division refined their approach and became the first unit to officially use a SWEAT Model to restore essential services LOO.<sup>86</sup> Within the essential services line of operation, the division staff organized the Division Engineer Section and 9<sup>th</sup> Engineer Battalion assets to direct planning, design, and execution towards projects that improved the quality of life for the Iraqi people. The new SWEAT Model helped the division refine their focus, develop a restoration execution plan, determine how to monitor improvement metrics, and provide guidance to subordinate units in order to focus on security and essential services.<sup>87</sup> The 1st Cavalry Division’s Brigade Combat Teams now had their areas of

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<sup>85</sup> Plummer, 2. Plummer’s monograph lays out the differences between essential services in Baghdad before and after the war. By 2005, the difference between the Iraqi populace’s expectations of what American forces could provide in essential services versus the actual amount of change on the ground caused a great deal of tension and violence in Baghdad and in neighboring provinces.

<sup>86</sup> Ibid., 1-2. 1<sup>st</sup> Cavalry Division written orders and after-action-reports outline the division’s essential services restoration approach as the SWET, SWET-H, or SWET-MSO Model. For simplification, this monograph will refer to these approaches as the SWEAT Model.

<sup>87</sup> Chiarelli and Michaelis, 10. The division dedicated the expertise of the engineer corps and established a cooperative effort with the University of Baghdad to identify, fund, and work with local government officials, contractors. They also worked with the U.S. Department of State and the U.S. Agency for International Development (USAID) to provide the essential services critical to demonstrating those visible first-mile signs of progress in areas most likely to produce insurgent activity.

operation underpinned with a clear direction and focus, which was on rebuilding, repairing, and eventually monitoring the essential service infrastructure in Iraq.

At a more micro level, 1<sup>st</sup> Cavalry Division's subordinate units focused on the "first among equals" line of operation as an opportunity to use CERP through local contractors and labor to repair or create basic services while creating jobs. One subordinate unit, the Brigade Troops Battalion (BTB), 2<sup>nd</sup> Brigade, 3<sup>rd</sup> Infantry Division partnered with the 20<sup>th</sup> Engineer Brigade on the division's main effort in eastern Baghdad's Sadr City.<sup>88</sup> Based on the specific SWEAT Model provided by 1<sup>st</sup> Cavalry Division, the requirements to plan and manage essential services required engineer expertise. To address this need, the BTB and 20<sup>th</sup> Engineer Brigade created a SWEAT Shop in which they partnered with local advisory and engineering committees to determine needs, conduct infrastructure reconnaissance, scope requirements, and design projects within the SWEAT categories. As outlined by Major Alexander Fullerton, the BTB SWEAT Shop worked with city engineers to establish basic local services and to provide employment within neighborhoods ripe for insurgent recruitment, both of which directly undermined the insurgent base of support.<sup>89</sup>

## **Results and Evaluation**

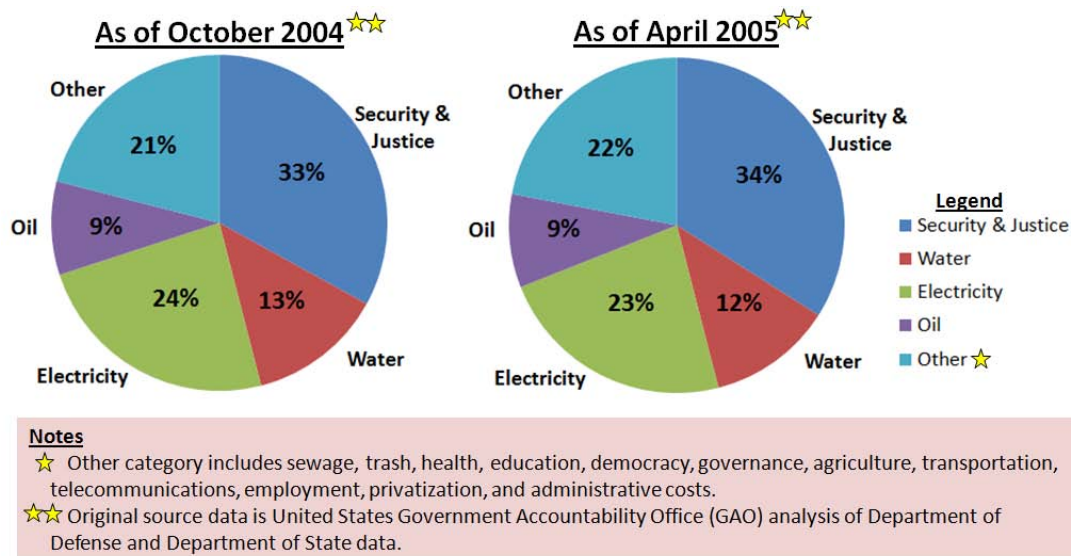
During the 1<sup>st</sup> Cavalry Division's time as MND-B, the division, assigned units, and the supporting 20<sup>th</sup> Engineer Brigade invested over \$200 million into specific SWEAT improvements and essential services restoration. To supplement 1<sup>st</sup> Cavalry Division's efforts, the United States Army Corps of Engineers Gulf Region Central District provided engineering design, planning, and contract oversight on over 500 SWEAT projects worth \$500 million inside Baghdad with most spending allocated toward seven water plants, four waste water plants, 807 school

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<sup>88</sup> Fullerton and Myers, 7. According to Fullerton and Myers, the Brigade Troops Battalion (BTB) usually provides a Brigade Combat Team with intelligence, engineering, military police, administrative, and management support during required contingency missions or operations.

<sup>89</sup> Plummer, 11.

renovations, and 15 major electrical projects.<sup>90</sup> Units focused projects on highly populated urban areas and relegated rural areas to second priority. As shown in the Government Accountability Office's (GAO) spending in narrow categories correlated almost exactly to the SWEAT Model with prioritization coming more from cost of projects than from focus on specific categories.



**Figure 8: Reconstruction Funds Distributed by Sector for 2004 and 2005<sup>91</sup>**

Despite providing temporary jobs and improving service conditions in Baghdad, Iraqi opinion of services and support remained low. Task Force Baghdad SWEAT Model proponents believed that projects would not only provide jobs and empower the Iraqi government, but essential services efforts would stimulate the economy, improve quality of life, and prevent people from joining the insurgency. As more Iraqis purchased cars and electrical equipment that

<sup>90</sup> Office of the Assistant Secretary of the Army (Acquisition, Logistics, & Technology) and the U.S. Army Corps of Engineers, "Iraq Reconstruction Report: Focusing on Construction and Sustainment, 12.08.06" Arlington, VA: Strategic Communications Office, 2006. [http://www.dvidshub.net/index.php?script=pubs/pubs\\_show.php&id=18&name=Iraq%20Reconstruction%20Report](http://www.dvidshub.net/index.php?script=pubs/pubs_show.php&id=18&name=Iraq%20Reconstruction%20Report) (accessed on January 25, 2011), 2-3.

<sup>91</sup> Joseph A. Christoff, "Rebuilding Iraq: Status of Funding and Reconstruction Efforts," *Report to Congressional Committees - GAO-05-876* (July 2005), United States Government Accountability Office (GAO): Washington, D.C., 2005, <http://www.gao.gov/new.items/d05876.pdf> (accessed on January 25, 2011), 7. This chart highlights use of the SWEAT Model throughout Iraq. The figure also shows that little change took place in spending during 2004 and 2005. Spending focused on the SWEAT-MSO categories and dwarfed security and justice spending. The report makes the critical note, almost foreshadowing, that without security all essential services efforts will ultimately fail.

Saddam had banned during his regime, Iraqi demand for public services increased exponentially and hindered the planned quality of life impacts from Task Force Baghdad projects. Because Iraqis could not complete training and preparation to operate and maintain the power plants, water and sewage treatment facilities, and health care centers the U.S. had rebuilt or restored, projects brought on an initial change until facilities fell into disrepair.<sup>92</sup>

As shown in Figure 9, surveys in the summer of 2006 by U.S. Joint Warfare Analysis Center researchers Frederick Barton and Bathsheba Barton show decreasing satisfaction with new Iraqi Government and U.S.-led Coalition Force (CF) performance. By interviewing large portions of the local population in each Iraqi province, Barton and Crocker determined that techniques for restoration of essential services and the methods communicating positive changes to the population had little positive impact on the population's opinion.<sup>93</sup> Comments revealed that both the CF and the Iraqi Government failed to address priority needs and concerns of these residents.

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<sup>92</sup> Joseph A. Christoff, *Rebuilding Iraq: Stabilization, Reconstruction, and Financing Challenges - GAO-06-428T*, Testimony before the Committee on Foreign Relations, United States Senate (February 8, 2006), United States Government Accountability Office (GAO): Washington, D.C., 2006, <http://www.gao.gov/new.items/d06428t.pdf> (accessed on January 25, 2011), 19.

<sup>93</sup> Barton and Crocker, 45-55. This national survey of Iraq shows the importance of jobs and basic needs to the people. By the end of 2005, the survey shows a growing trend of displeasure with Government of Iraq (GoI) and Coalition Force (CF) performance based on the limited services and growing violence.

Perception or Response Availability of...	Improved	Same	Worse	Comments
Sanitation (Sewer)	5%	30%	65%	75% of sewage flows into rivers, damaged and dilapidated infrastructure
Water (Water)	20%	60%	20%	170% increase in potable water from prewar levels, heightened expectations
Power (Electricity)	31%	23%	46%	Higher demand, perceived shortage, highest infrastructure priority
Sanitation (Trash)	5%	30%	65%	Not separated from sewage in survey
Transport (Transportation)	15%	60%	25%	Generally split, attacks on bridges and roads decreased satisfaction
Fuel (Oil/Gas)	20%	40%	40%	Crude production lower, larger imports, attacks on shipments, long lines
Communication (Comm/Media)	60%	30%	10%	Cell phones banned during Saddam regime, becoming available
Jobs	26%	24%	50%	General displeasure about jobs and government spending
Products and services beyond basic needs	50%	30%	20%	Many products not available during Saddam regime

**Figure 9: Measuring Iraq's Reconstruction Effort and Population Satisfaction**<sup>94</sup>

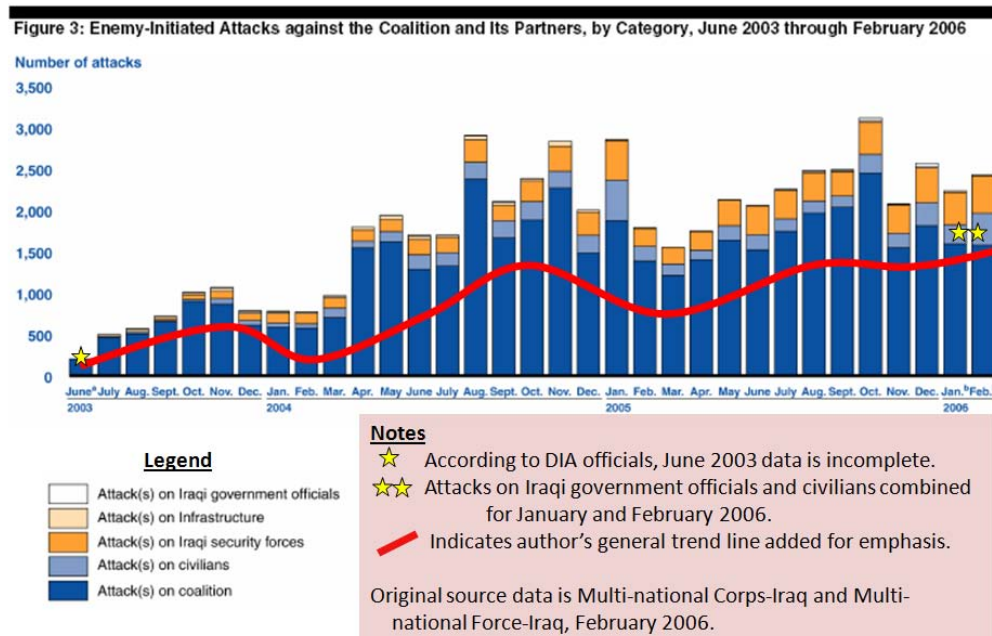
Perhaps the greatest disappointment came in 2005 and early 2006 when the security situation deteriorated despite huge investments in infrastructure and essential services around Baghdad. Using the SWEAT Model and government feedback, Task Force Baghdad implemented a process that invested heavily into the perceived needs and wants of the Iraqi people. SWEAT Model implementation injected money into the economy and repaired much of the dilapidated infrastructure, but it missed many critical requirements requested by the people. In addition, corruption by contractors, ineptitude within the Iraqi Ministries, and focus on easy projects like school construction reduced the positive impacts of CERP.<sup>95</sup> By early 2006, the United States Army Corps of Engineers reported drops to 6.4 hours of electricity in Baghdad per

<sup>94</sup> Ibid., 52-64. This table outlines the author's interpretation of Iraqi services satisfaction at the time of Barton and Crocker's survey. The percentages outline general percentage of people surveyed who met each criteria or category. Barton and Crocker show that most perceptions actually decreased between 2004 and 2006 because of the Coalition's inability to deliver goods and services at a rate higher than Saddam's regime and because of the Iraqi populace's heightened expectations for services and support.

<sup>95</sup> Christoff, 15-25. The results of the U.S. Joint Warfare Analysis Center's summer of 2006 survey of some of the local population in Iraq will reveal that the majority of their higher priority needs and concerns were not being addressed or met by the U.S. Coalition forces or the Iraqi government.



day versus 11 hours outside Baghdad.<sup>96</sup> After reaching a low point of 1,500 monthly attacks in early 2005, attacks increased through 2005 to a high of nearly 3,000 by September 2005.<sup>97</sup>



**Figure 10: GAO 2005/2006 Report on Enemy Initiated Violence<sup>98</sup>**

## Simplicity

The SWEAT Model's eight categories provide a simple framework, which facilitates restoration actions with limited technical experience. Units have used the SWEAT Model for six years now because the model seems simple. As a caution shown in Figure 8, 1<sup>st</sup> Cavalry

<sup>96</sup> Office of the Assistant Secretary of the Army (Acquisition, Logistics, & Technology) and the U.S. Army Corps of Engineers, 6. This 2006 report shows drops in almost all essential services areas between 2004 and 2006. Based on enemy attacks and project delays, the real and perceived restoration of essential services failed to help the people of Baghdad and improve their support to the Iraqi Government.

<sup>97</sup> Dale, 136. Graphic portrays the number of attacks in Iraq by month on Coalition Forces and their partners. The 1<sup>st</sup> Cavalry Division transferred authority to the 3d Infantry Division in February 2005 and completed redeployment in April 2005. Dale points out that after a large drop in late 2004, early 2005, attacks steadily increased through the "surge." See also Figure 10 for a graphical representation.

<sup>98</sup> Christoff, 6 and 15. Although the direct correlation between essential services and violence exists outside the scope of this monograph, the GAO's data shows that project completion helped decrease violence in early 2005. Violence escalated as the security situation deteriorated and Coalition Forces projects began to fail due to lack of maintenance.

Division's use of the SWEAT Model focused support into narrow categories. To overcome technical limitations, the command executed easier projects that required less technical expertise. These factors prevented holistic solutions and discriminated against rural areas around the city of Baghdad. The SWEAT Model's focus on how to think about categories of projects has prevented effort and support to different areas like Northern Baghdad's rural districts or Qadas that need categories other than SWEAT. Although the SWEAT Model allows many non-engineers to apply funds in restoration categories, the SWEAT Model provides little to the no process non-technical branches to plan, resource, and manage improvements.

### **Flexibility**

The SWEAT Model allows for hasty and deliberate application. Although the SWEAT Model is simple, easy to teach, and quick to execute, using a countrywide model for categories limits geo-cultural analysis and prevents nesting with local and national priorities. Based on its urban focus, the model has limited effectiveness through many environmental conditions including rural or agricultural areas. In 1<sup>st</sup> Cavalry Division's case, this drawback balanced the fact that one third of the country's population lived in Baghdad's urban areas.

### **Reproducibility**

The SWEAT Model uses the infrastructure categories generally applicable to past military operations. The SWEAT Model used by 1<sup>st</sup> Cavalry Division could find valuable lessons from historic operations like Vietnam. Marine and Army units in early Operation Iraqi Freedom used the SWEAT Model with positive results. Because the generic "other" category prevents holistic focus on other services and application of cultural analysis limits full understanding of needs, the SWEAT Model might be difficult to apply effectively to future areas of operation. In the case of 1<sup>st</sup> Cavalry Division, the SWEAT Model failed to support rural requirements therefore allowing insurgency to build and affect the urban centers.

### **Sustainability**

Unlike most other essential services models, the SWEAT Model has wide use and documentation in doctrine. To its detriment, effective use of the doctrinal model requires integration of outside technical manuals and reconnaissance tools. The Department of State and other U.S. government entities understand and use variants of the SWEAT Model in their own analysis. The model integrates well into reconnaissance tools and project management capabilities within SWEAT categories; however, the static SWEAT-MSO categories prevent units from capturing the feedback from Intelligence Preparation of the Battlefield (IPB) products like the operational variables political, military, economic, social, infrastructure, information, physical environment, and time (PMESII-PT). Using intelligence to better pinpoint populace needs may help locals sustain the output because they received something they needed. The 1<sup>st</sup> Cavalry Division used the model to focus on and gain many short term wins, but a similar, national-level focus on SWEAT categories prevented a long term tailoring of essential services to Iraq regions. The model considers only specific categories for project prioritization, which means that anything outside the categories are excluded from the list. For long term use, units must adapt the SWEAT Model to local tailoring, modification, prioritization, and assessment.

### **Links to Political and Military Objectives**

As shown by Case A, the SWEAT Model and its application by 1<sup>st</sup> Cavalry Division generally supported the essential services line of effort established by the Bush Administration, CJTF-7, MNF-I, and MNC-I. The 1<sup>st</sup> Cavalry Division applied a comprehensive cost versus benefit analysis of area requirements. Essential services became a priority for MND-B, allowing them to apply considerable manpower, technical expertise, and resources towards accomplishing their objectives. Despite MND-B placing a priority on essential service operations, prescriptive SWEAT guidance forced subordinates into a narrow focus. The lack of analysis in categories outside SWEAT resulted in many key Iraqi Government Ministries and Civil Service Directorates having limited interaction with U.S. forces and receiving no assistance in their area.

## Case B: Factor-Precedence Model in Baghdad, Iraq (2009)

### Case Context and Unit Approach

In Case B, 1<sup>st</sup> Cavalry Division's return to Baghdad in 2009 came within the context of President Bush's "surge" of combat forces into Iraq. In President Bush's January 10, 2007 address to the nation, he announced that implementation of a "New Way Forward" would deploy additional military units to Iraq, primarily to Baghdad. President Bush's surge forces would, in a paraphrase of the "clear, hold, build" language from 2006, "help Iraqis clear and secure neighborhoods, help them protect the local population, and help ensure that the Iraqi forces left behind are capable of providing the security that Baghdad needs."<sup>99</sup> When General David H. Petraeus and his MNF-I planning team developed the military campaign plan to leverage the surge's additional troops, break the cycle of sectarian violence, and implement the "clear, hold, build" strategy, they made protecting the population the military's top priority in Iraq. Leveraging Dr. Kilcullen's counterinsurgency designs and synchronizing military efforts with U.S. Ambassador to Iraq Ryan Crocker's diplomatic missions, MNF-I set the conditions for military and diplomatic success using Operation Fardh al-Qanoon, Iraqi Arabic for Operation Together Forward.<sup>100</sup> On September 16, 2008, General Petraeus relinquished command of MNF-I to Army General Raymond Odierno, a former Commanding General of Multi-National Corps-Iraq (MNC-

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<sup>99</sup> Dale, 67-70. Dale provides a comprehensive outline of the Bush Administration's "clear, hold, build" approach and language that led up to continued after the "surge." Dale found most of his information in the White House Fact Sheet: "Strategy for Victory – Clear, Hold, Build" dated March 20, 2006.

<sup>100</sup> Bianka J. Adams, *Command Report, 2009 Multi-National Division Baghdad, 1<sup>st</sup> U.S. Cavalry Division* (Fort Hood, TX: Division Historian Publications, 2010), [http://www.ndia.org/Divisions/Divisions/SOLIC/Documents/Command\\_Report\\_12-10-10.pdf](http://www.ndia.org/Divisions/Divisions/SOLIC/Documents/Command_Report_12-10-10.pdf) (accessed on January 25, 2011), 7. Often called the Baghdad Security Plan, Operation Fardh Al Qanoon displayed an offensive nature and established security sites and operating bases in the Iraqi community. Within the Baghdad area of operations, the Department of State embedded civilian-heavy PRTs with military units at the brigade level, ePRTs, and division level, PRT-B, to assist with humanitarian aid and reconstruction projects. See also Dale, 73-74.

I).<sup>101</sup> On November 17, 2008, Ambassador Crocker and General Odierno signed the Iraq Security Agreement with their Iraqi counterparts that changed counterinsurgency techniques and partnership requirements across Iraq.<sup>102</sup>

The new Iraq Security Agreement required Multi-National Division - Baghdad (MND-B) to take a partnered approach in all areas, especially essential services, and forced a review of the Baghdad Campaign Plan. When the 1st U.S. Cavalry Division assumed command and control of MND-B on February 10, 2009, the division received requirements to protect the people of Baghdad, to implement the Security Agreement's demands for partnered operations, and to withdraw all U.S. combat forces from Iraqi "cities, villages, and localities" by June 30, 2009.<sup>103</sup> By March 2009, most Coalition "surge" forces had redeployed leaving MND-B with six brigades of 35,000 personnel, thirteen larger Forward Operating Bases (FOB), fifty-five Joint Security Stations (JSS), and seven small Combat Outposts (COP) throughout Baghdad.<sup>104</sup>

Aware of Baghdad's importance as a microcosm of Iraq for the overall security and stability of the country, Major General Daniel P. Bolger, commander of the 1st Cavalry Division and MND-B, emphasized partnership with the Iraqi Security Forces as the cornerstone for his campaign concept with three lines of effort (LOEs) including Iraqi Security Force (ISF) Partnership, Targeting and Security, and Civil Capacity.<sup>105</sup> Figure 11 shows MND-B's Campaign

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<sup>101</sup> Author's Note: MNC-I forms the operational-level command under MNF-I so General Odierno already had intimate knowledge of the area and understood the inner-workings of General Petraeus' plan.

<sup>102</sup> Adams, 8. The Security Agreement's Articles 4 and 22 took effect in January 1, 2009 and established the parameters within which the U.S. forces could conduct operations.

<sup>103</sup> Ibid., 6.

<sup>104</sup> Ibid., 6 and 14. In February 2009, MND-B was an organization of six Brigade Combat Teams (BCTs) including 1st and 3d Brigade Combat Teams (BCT), 4th Infantry Division; 3rd BCT, 82nd Airborne Division; 2nd Stryker Brigade Combat Team (SBCT), 25th Infantry Division; BCT, 1st Infantry Division; and the 2nd BCT, 1st Armored Division. The 4th Combat Aviation Brigade provided air support.

<sup>105</sup> Ibid., 11. The Commander's Intent published by Major General Bolger stated that MND-B would "[p]rotect the people of Baghdad – that's why we're here. Operating by, with, and through our Iraqi Security partners, we isolate the enemy (AQI, VE, others as designated) intimidating the people. Combined offensive operations provide the sustainable security that permits continued Iraqi political and economic

Design established by Major General Bolger to secure the population and increase Iraqi government legitimacy. Within the MND-B Campaign Design, Major General Bolger clearly expressed his mission statement and intent to establish an environment of sustainable security in Baghdad from which the sustaining LOE, Civil Capacity, could gain the strength and momentum necessary to increase government legitimacy.<sup>106</sup> Key Civil Capacity goals included assisting the Government of Iraq (GoI)'s rule of law initiatives, supporting the election process, mentoring GoI departments with budget execution, and helping to improve essential services. Essential services would serve MND-B as an important sustaining operation within the Civil Capacity LOE.

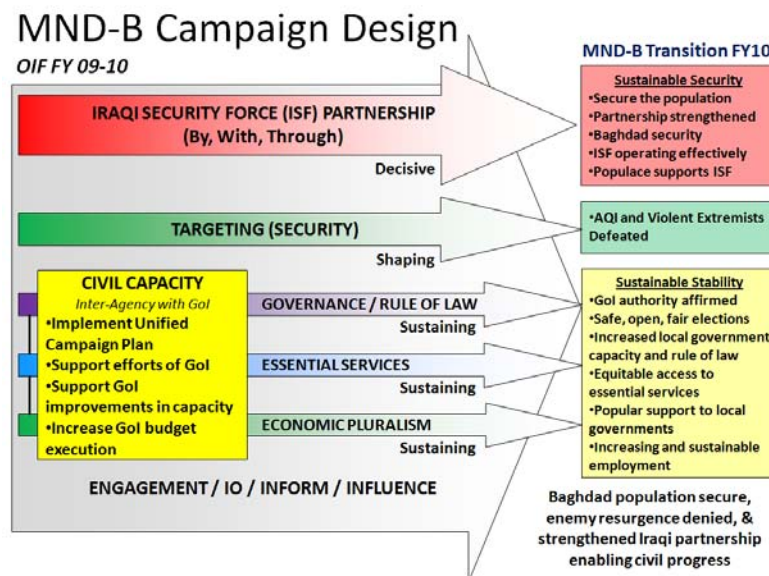


Figure 11: MND-B (1<sup>st</sup> Cavalry Division) Campaign Design and Lines of Effort<sup>107</sup>

growth. As Iraqi civil capacity expands our emphasis on stability operations increases proportionately. Throughout, we'll fight to see Baghdad as it is: the people, the enemy, and our combined forces. Success equals the *Baghdad population secure*, the *enemy resurgence denied*, and our *partnership with the Iraqis strengthened*."

<sup>106</sup> Ibid., 8. Adams provides a quote taken from OPORD 09-01A. The unit's overview of mission, intent, and end state provided italics for emphasis in the original operations order. The commander's intent stated that "[s]uccess equals the Baghdad population secure, the enemy resurgence denied, and our partnership with the Iraqis strengthened." The end state envisioned the affirmation of GoI authority, increased local government capacity and the rule of law, open and fair elections, equitable access to essential services, and increasing and sustaining employment.

<sup>107</sup> Ibid., 34 and 47. This figure shows the author's interpretation and summary of the 1<sup>st</sup> Cavalry's Campaign Plan portrayed in the 2009 Command Report.

## **Essential Services Operations and the Factor-Precedence Model**

Implementation of the Iraq Security Agreement combined with 1<sup>st</sup> Cavalry Division's arrival to Baghdad caused many changes within MND-B's essential services operations in 2009. Requirements to turn bases within the city over to Iraqi Security Forces forced MND-B to shift essential services focus away from traditional SWEAT Model categories into a broader set of categories and support based on geographical and cultural factors in both the city and in the surrounding agricultural areas.<sup>108</sup> New restrictions on spending and the requirements to work with Provincial Reconstruction Team – Baghdad (PRT-B) leading reconstruction working groups forced MND-B to reassess leadership and essential services priorities.<sup>109</sup> MND-B adjusted procedures to evaluate the longer-term time horizons, compare interdependencies of unit options, and recalculate the utility of critical actions based on PRT-B feedback. To comply with new integration rules within the Security Agreement, MND-B began working all actions through the appropriate levels of Iraqi government to integrate local priorities and cultural requirements into the essential services model. As a result of Security Agreement's deadlines to move out of the cities, restrictions on spending, and requirements to work through the local governments, the 1<sup>st</sup> Cavalry Division adopted an essential services restoration approach that exhibited many components of the Factor-Precedence Model.

Requirements to move out of city bases helped MND-B shift essential services focus away from the traditional SWEAT Model categories into a broader set of categories and support based on geographical and cultural factors. The 1<sup>st</sup> Cavalry Division Essential Services (ESS)

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<sup>108</sup> Ibid., 12. The brigades supported the division's capacity building efforts through Commanders' Emergency Response Program funding critical projects.

<sup>109</sup> Ibid., 40-41. Based on MNF-I guidance to place PRT-B in the lead for actions within Baghdad Province, Colonel Timothy Parks, MND-B Chief of Staff, adopted a no-traditional staff structure consisting of centers, cells, and working groups to streamline the decision making process and connect actions with both PRT-B and Iraqi counterparts. There were four division centers, Current Operations, Future Operations, G5 Plans, and Assessments supported by four cells, Iraqi Security Forces Cell, Targeting, Civil Capacity, and Engagements.

Section assessed that despite seven years of “reconstruction,” many of the infrastructure systems failed to meet minimum international standards or meet the needs of the Iraqi people.<sup>110</sup> As shown in Case A, units using the SWEAT Model had focused on repairing urban infrastructure and conducted repairs in the narrow SWEAT categories. After moving to bases and camps outside the city, MND-B began to focus on both the city and the surrounding agricultural areas in nearly every area of essential services. As highlighted in the MND-B’s 2010 CERP spending shown in Figure 12, MND-B focused outside traditional SWEAT categories into wide ranging categories including education, telecommunications, humanitarian assistance, transportation, sewer, water, electricity, trash, agriculture, and health. MND-B’s expanded infrastructure category focus exemplified nearly all of the recognized essential service categories espoused by the Factor Precedence Model.

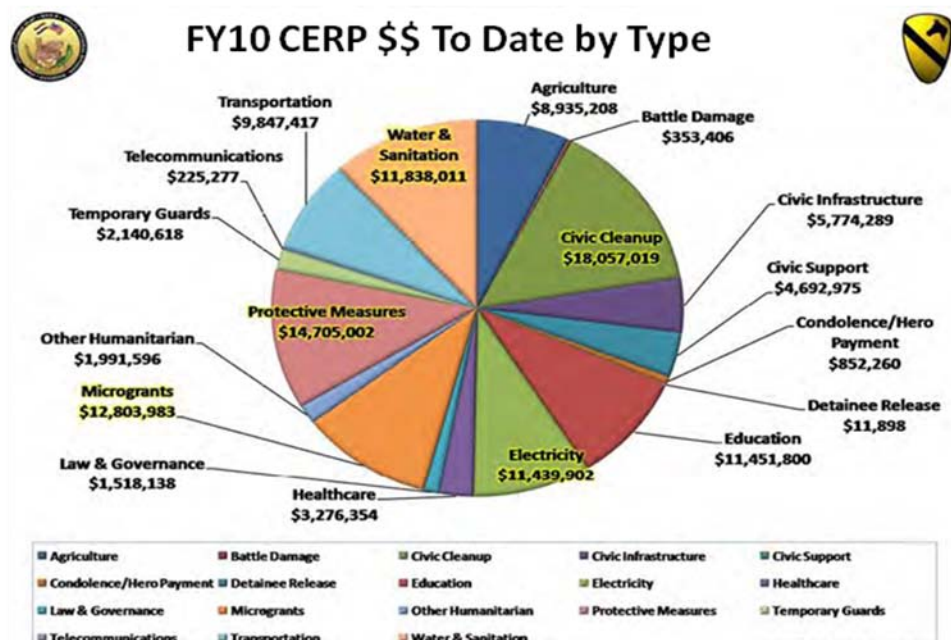


Figure 12: Distribution of CERP Funds by MND-B in Fiscal Year 2010<sup>111</sup>

<sup>110</sup> Ibid., 74.

<sup>111</sup> Ibid., 71.



In addition to deviating from the old SWEAT Model's category focus, the 1<sup>st</sup> Cavalry ESS Section and subordinate essential services practitioners concentrated on improving the essential services within Baghdad's geographical and cultural factors. As U.S. combat forces transitioned out of Baghdad, they shifted focus to more geographically varying terrain much different from the city. Rural governments, called Qadas, had limited population densities and urban infrastructure like sewers, but they had significant irrigation and drainage infrastructure to facilitate an agricultural economy and apply local resources.<sup>112</sup> These agricultural areas like Taji and Tarmiyah Qadas supported the city with food and offered areas where insurgents could hide if supported by the population. By adopting a model similar to the Factor-Precedence Model, 1<sup>st</sup> Cavalry Division supported agricultural projects in the outlying areas of Baghdad Province while focusing on urban-based projects like electricity and sewage inside the city.<sup>113</sup> To address cultural factors within the quickly changing operating environment, MND-B established cultural measures for improvement within each category focused on meeting minimum humanitarian standards, achieving the quality of life acceptable to the people in and around Baghdad, and restoring services required to make any modern society function. Similar to the recommendations provided by the Factor-Precedence Model, subordinate brigades modified SWEAT categories to meet the constituent's geographical and cultural factors.

While moving out of the city shifted MND-B focus into broader categories, geographical factors, and cultural factors, new restrictions on spending and the requirement to work with the PRT-B leading reconstruction working groups forced MND-B to reassess leadership and essential

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<sup>112</sup> Author's Note: Rural government structures around Baghdad, Iraq started at the local level with Nahias. A Nahia equates roughly to a town or city council in the United States. The Nahias answered to the next level of rural government, the Qada. A Qada equates roughly to a District or county in the United States. Each Qada reported directly to the Governorate led by the Governor of Baghdad. The Amanat, or literally city hall, ran the metropolitan region of Baghdad as an equivalent to a national ministry. Baghdad Amanat approved and managed all operations and projects inside the city limits.

<sup>113</sup> Adams, 40-41.

services priorities.<sup>114</sup> On 1 May 2009, a new CERP Standard Operating Procedure (SOP) for projects in the Baghdad Amanat went into effect.<sup>115</sup> The new SOP required a Memorandum of Agreement (MOA) approved by the end using Iraqi government entity like the Amanat, Governorate, or Ministry before any project could proceed. The new process increased the coordination process between American and Iraqi essential services practitioners and ensured that the GoI would take over all projects, operations, and maintenance when completed.<sup>116</sup> To comply with the new CERP SOP, MND-B and subordinate essential service practitioners integrated local government and local leadership priority elements of the Factor-Precedence Model into project planning and prioritization.

To support PRT-B's leadership role in Iraqi stability operations and reconstruction, MND-B adjusted procedures to integrate projects with long-term time horizons. Before 2009, the Department of State and the United States Agency for International Development (USAID) had generally focused on services and governance capacity development. In essential services, this capacity development included long-duration, large-scale, strategic-level projects. The long timelines made these larger projects impractical for MND-B or subordinate brigade involvement because of timelines and expertise. To close the gap between large projects favored by diplomatic practitioners with the small projects favored by military practitioners, PRT-B and MND-B involved experts from both organizations to work beside military units and ensure short, mid, and

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<sup>114</sup> Ibid. Based on MNF-I guidance to place PRT-B in the lead for actions within Baghdad Province, Colonel Timothy Parks, MND-B Chief of Staff, adopted a no-traditional staff structure consisting of centers, cells, and working groups to streamline the decision making process and connect actions with both PRT-B and Iraqi counterparts. There were four division centers, Current Operations, Future Operations, G5 Plans, and Assessments supported by four cells, Iraqi Security Forces Cell, Targeting, Civil Capacity, and Engagements.

<sup>115</sup> Ibid., 68. The GOI and the Coalition Forces had originally agreed on the new procedure in October 2008, but neither side had applied it.

<sup>116</sup> Ibid. In practice, it had an unintended side effect of slowing down projects which the BCTs wanted to perform because most projects now required Amanat, Governorate, or Ministerial approval. Iraqi project verification and approval could take weeks, if not months before an authorized official signed the approval documents.

long-term projects made it into planning and funding priorities.<sup>117</sup> MND-B and PRT-B's use of time horizon as an important component of prioritization highlighted another component of the Factor-Precedence Model.

To balance military operations with holistic Iraqi requirements, MND-B began to compare interdependencies of unit options and recalculate the utility of critical actions based on PRT-B feedback. To allow the subordinate brigades the freedom to decide where and how they wanted to perform restoration operations, the Division abolished the centralized priority list of the ten most important projects that the 4th Infantry Division had used to divide resources. The new list of combined political and military services priorities allowed MND-B's subordinate brigades and partnered embedded Provincial Reconstruction Teams (ePRTs) to begin developing priorities using systems analysis and utility assessments.<sup>118</sup> This new technique allowed personnel on the ground to investigate the interdependencies between essential services and recommend actions or projects to improve the situation. With the units that lived in the affected areas and knew best when, where, and how to perform restoration providing feedback on the utility of actions, MND-B better allocated limited resources and effort in Baghdad's rural and urban areas.

Because the Security Agreement required Coalition Forces to work all actions through Iraqi government officials, MND-B and PRT-B utilized more local and city government feedback to prioritize actions and expenditures. To gain the appropriate approvals on new projects, MND-B and PRT-B had to establish connections with every level of executive and legislative leadership.

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<sup>117</sup> Norris Jones, "Upgrading Baghdad Essential Services." *Iraq Reconstruction Report (December 2006)*. Baghdad, Iraq: United States Army Corps of Engineers, 2006, 2. In addition to taking too long for military units to execute, strategic level and long duration projects typically required more expertise than MND-B or its subordinate brigades could provide. Large scale project responsibilities shifted to entities such as the Iraqi Transition Assistance Office for the Department of State and the U.S. Army Corps of Engineers (USACE) for the Department of Defense. The USACE International Zone office took over 150 projects worth \$500 million to upgrade essential services in Baghdad.

<sup>118</sup> Author's Note: As mentioned earlier, the Department of State provided ePRTs to work with many of the brigades who owned important areas of operations. These ePRTs worked on important political and economic missions alongside the combat brigades and eventually took the lead on operations after the Security Agreement went into effect.

A critical connection came when leadership broke from the SWEAT Model to align support with government ministries in every category of infrastructure. MND-B's G-9 section, responsible for Civil Military Operations (CMO) that included oversight of the CERP, reconstruction activities, infrastructure repair, economic assistance, support to civil administration, and humanitarian assistance, reapportioned money and priorities based on the feedback coming from units and from the Iraqi government.<sup>119</sup> Division and brigade practitioners engaged and mentored government officials, studied the existing service categories, and promoted Iraqi government activities by providing resources, when needed, through CERP projects. The new cooperation led to better connections between projects and efforts. As an example, during meetings with Ministry of Water Resources (MoWR) representatives, MND-B G-9 identified two major irrigation projects in Mahmodiyah Qada that would help alleviate water shortage for both irrigation and drinking needs. One of these projects, the repair of the Latifeeyah boost water pump and construction of associated irrigation canals, affected between 125,000 to 150,000 farmers in the area south east of Baghdad. This area had experienced little essential services support in the past and had suffered as an insurgent safe-haven for years.<sup>120</sup> Much like the tenets of the Factor-Precedence Model, MND-B's revived connection with Iraqi leaders helped integrate local priorities and culture back into the essential services model.

## **Results and Evaluation**

As a result of the adoption of the new counterinsurgency approach, security in Baghdad and its environs improved dramatically.<sup>121</sup> 1<sup>st</sup> Cavalry Division's time as MND-B laid the ground work for the enlargement of the division's area of responsibility including Anbar Province and further reduction of forces in Baghdad. In January 2010, the Division handed over authority of

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<sup>119</sup> Adams, 71.

<sup>120</sup> Ibid., 78.

<sup>121</sup> Ibid., 7.

Multi-National Division Baghdad, now renamed U.S. Division Central, to the 1st Armored Division.<sup>122</sup> Another area of focus was shaping the Brigade Combat Teams (BCT) battle space through legitimate local leadership and CERP funding.<sup>123</sup> That gradual growth was punctuated by sharp upward spikes at key Iraqi political junctures, including the January 2005 elections and the October 2005 constitutional referendum, and, less sharply, during Ramadan each year. After July 2007, the overall level of attacks declined sharply, punctuated by a spike during Iraqi and coalition operations in Basra and Sadr City, in March 2008. By late 2008, the level of attacks had fallen to well under 200 per week – levels last witnessed at the beginning of 2004 – and those gains held through February 2009.<sup>124</sup> The following sections provide a brief overview of each evaluation criteria based on the case study.

ESSENTIAL SERVICES							
METRIC	PRE-INVASION	POST-INVASION	CPA TRANSITION	NEGROPONTE ERA	KHALILZAD ERA	SURGE ENDS	END OF COMBAT OPERATIONS
Electricity Production <sup>a</sup>							
Megawatts	4,075	711	3,621	4,262	3,475	4,400	6,540
Oil Production							
Million Barrels per Day	2.58	0.30	2.16	2.13	1.95	2.43	2.33
Iraq Security Forces (Cumulative)							
Assigned Soldiers and Police	1,300,000	7,000–9,000	87,000	171,300	328,700	478,500	793,289
Telecommunications							
Landline Subscribers	833,000	0	791,000	998,000	1,111,000	1,200,000	Not available
Mobile Subscribers	80,000	0	461,000	2,422,000	8,720,000	~13,000,000	22,551,000
Human Toll (Cumulative)							
U.S. Troop Fatalities		139	862	1,745	3,248	4,115	4,415
Civilian Contractors		1	46	217	916	1,229	1,507 <sup>b</sup>
U.S. Civilians		–9	52	113	224	271	310
Iraqi Civilians		7,413	16,848	29,155	72,858	95,236	113,701
Financial Cost (\$ Billions, Cumulative)							
U.S. Funding		\$3.45	\$22.93	\$29.21	\$36.96	\$50.46	\$56.81
Iraqi Funding		\$0.00	\$16.00	\$21.03	\$37.27	\$50.33	\$85.31 <sup>c</sup>
International Funding		\$0.00	\$13.60	\$13.87	\$15.20	\$17.00	\$12.01 <sup>d</sup>
Total Funding		\$3.45	\$52.53	\$64.11	\$89.43	\$117.79	\$154.12

**Figure 13: SIGIR U.S. Reconstruction Effort Metrics as of October 30, 2010<sup>125</sup>**

<sup>122</sup> Ibid., 67.

<sup>123</sup> Special Inspector General for Iraq Reconstruction (SIGIR), “October 2010 Quarterly Report to Congress.” <http://www.sigir.mil/publications/quarterlyreports/index.html> (accessed on November 20, 2010), 20–22.

<sup>124</sup> Dale, 137.

<sup>125</sup> SIGIR, “October 2010 Quarterly Report to Congress,” 22.

**Simplicity**

The Factor-Precedence Model's initial sixteen categories require detailed and time consuming analysis. Although slightly more complex than the SWEAT Model, the Factor-Precedence Model increases in simplicity after the initial evaluation of local needs and services. Once established, the Factor-Precedence Model's focus on four to seven categories after refinement step keeps prioritization and restoration work relatively simple. Based on 1<sup>st</sup> Cavalry Division and their subordinate brigade's success in using the model, the process seems useful to all branches tasked with civil-military support.

**Flexibility**

The Factor-Precedence Model allows for hasty and deliberate application during operations. The Factor-Precedence Model provides focus on geographical and cultural factors allowing support to wide areas. 1<sup>st</sup> Cavalry Division's surges in urban areas like Abu Ghraib Qada and rural areas like Tarmiyah Qada provide evidence of the model's flexibility. The Factor-Precedence Model offers a holistic perspective that tailors focus within each area of operation and continuously assesses needs compared with local feedback. The Factor-Precedence Model user could focus on agricultural support in one area while building humanitarian assistance and housing capacity in another area. Because the Factor-Precedence Model allows diverse approaches at Division and Brigade levels, it is critical that headquarters synchronize their infrastructure master plans for long-term effectiveness and overall sustainability.

**Reproducibility**

Like the SWEAT Model, the Factor-Precedence model can apply to both historical and contemporary essential services efforts. The Factor-Precedence Model seems exceptionally useful in Iraq and could fare well in Afghanistan due to holistic nature of model. Based on limited case analysis, the holistic nature and flexibility of the Factor-Precedence Model seems uniquely capable of supporting future counterinsurgencies against hybrid threats. Circumstantial evidence

also indicates that the Factor-Precedence Model could find use restoring essential services in conflict outside of insurgencies.

### **Sustainability**

The Factor-Precedence Model provides focus on geographical and cultural factors allowing support to both rural and urban areas. The model ties in with nearly any existing intelligence, engineering, or management tool. Despite having no major conceptual issues, the model needs refinement for long term use and integration with emerging command and control techniques, namely mission command.

### **Links to Political and Military Objectives**

The Factor-Precedence Model facilitated focus on the critical problems while taking into consideration higher headquarters' guidance. When 1<sup>st</sup> Cavalry Division needed to move outside of urban areas, their Factor-Precedence-like approach proved useful in treating the local issues and focusing on changing needs. The model also facilitated ties into ministries at Baghdad level and allowed subordinate units to integrate with available local directorates. As mentioned earlier, the differing focus between government levels and geographic make-up requires synchronization between headquarters elements to prevent disconnects in support.

## **6 – Comparison and Afghanistan Example**

*“SWEAT is a great acronym. It has caught on and is in widespread use. Those infrastructure categories that make up the acronym SWEAT, however, do not always provide the infrastructure solution that the commander needs... As with any mission a prioritization of tasks must be made and using SWEAT alone cannot be relied upon in every scenario.”<sup>126</sup>*

*- The SWEAT/IR Book*

Based on the data provided by the primary case studies, this section compares the important variables of model effectiveness and variable applicability between the SWEAT Model and the Factor-Precedence Model. The primary case studies from the 1<sup>st</sup> Cavalry Division in Baghdad, Iraq provide an interesting comparison between two different essential services models

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<sup>126</sup> *The SWEAT/IR Book*, 5.

at work in similar situations. The comparison concludes, similar to the quote above, that the SWEAT Model provides a great acronym and has widespread use, but that the model's limitations prevent solutions that the commander and local populace need. To make the comparisons between the primary cases more relevant to current operations, this section introduces an illustrative example of the Factor-Precedence Model applied to 10<sup>th</sup> Mountain Division as Regional Command (RC) South in Kandahar, Afghanistan (2010). Adding this illustrative example facilitates conclusions on model applicability, effectiveness, and inferences for future actions not just in Iraq but in other places around the world.

### **Comparison of Case Studies**

When comparing the two models using the Iraq case studies, the Factor-Precedence Model emerges as more effective. The major advantages of the Factor-Precedence Model come because the model offers a more holistic perspective, allows for constant assessment and re-categorization, facilitates reprioritization, and focuses on the full range of military operations. Because the Factor-Precedence avoids the one size fits all categorization of the SWEAT Model, the Factor-Precedence Model can focus more on local needs and capacity thus increasing the sustainability by local leaders and government after improvements. Since case evidence shows that all branches can execute the model, the model can also help synchronize military and political elements on projects, support, and engagements that improve essential services. Most importantly, the Factor-Precedence Model allows for prioritization of effort, shifting priorities within unit areas of operations, or even project prioritization to meet needs of local areas.

The major disadvantage of the Factor-Precedence Model remains the fact that it is a new model not covered in doctrine. Based on the Iraq case studies, the SWEAT model has usefulness and has documentation in doctrine. Because units have used the SWEAT Model for over six years, the simple, easy to remember, and narrowly focused SWEAT Model has positive feedback from practitioners. Because the Factor-Precedence Model has more components than the existing



SWEAT Model, units may have a natural aversion against using it. The drawbacks from the SWEAT Model come from the limitations on analysis, especially when concerning culture, climate, and regional factors. Also, the SWEAT Model focuses on urban infrastructure categories like sewage and electricity. The effectiveness and applicability of both models in non-developed, rural areas like Afghanistan require additional analysis. Table 3 provides a brief summary of the comparison between the SWEAT Model and the Factor Precedence Model.

**Table 3: Summary of Case A to Case B Comparison between Essential Services Models**

	<b>Case A - SWEAT Model</b>	<b>Case B - Factor- Precedence Model</b>	
<b>Eval Criteria Short Title</b>	<b>Rating</b>	<b>Rating</b>	<b>Remarks</b>
<b>Simplicity</b>	+	-	SWEAT Model simple and used throughout military since 2004; units could learn the Factor-Precedence Model quickly and apply
<b>Flexibility</b>	-	+	Factor-Precedence Model much more flexible to environment, geography, and culture
<b>Reproducibility</b>	+	+	Both models allow for systematic application
<b>Sustainability</b>	-	+	Factor-Precedence Model holistic approach builds on past models, offers assessment for changes, and ties into all existing tools; Factor-Precedence Model appears more sustainable by local leaders and government after improvements
<b>Links to Political and Military Objectives</b>	+	+	Both models support lines of effort, objectives, and end state formulation; both models balance the costs and benefits of resources and combat power; Factor-Precedence Models feedback look may synchronize analysis, reprioritization faster

The Iraq case study's outcomes indicate that the Factor-Precedence Model could also prove effective in Afghanistan and future counterinsurgency operations. To make the best conclusions possible about the viability of the Factor-Precedence Model outside Iraq, an illustrative example from Kandahar, Afghanistan provides a hypothetical application of the Factor-Precedence Model and compares it against the effectiveness evaluation criteria.

### **Illustrative Example: Factor-Precedence Model in Kandahar, Afghanistan (2010)**

#### **Example Evaluation Framework and Model Effectiveness**

The evaluation of operations in Iraq shows a considerable difference between the effectiveness of the Factor-Precedence and SWEAT Models. By comparing use of the Factor-Precedence Model in Baghdad, Iraq with a hypothetical application of the Factor-Precedence Model in Kandahar, Afghanistan, an illustrative example facilitates universal conclusions on model applicability. Table 4 provides an outline of the controls, similarities, and differences between the two locations that facilitate comparison. Similarities between Iraq and Afghanistan such as general time period, use of full spectrum operations, experience of American Soldiers, and models available facilitate comparison between the two very different political and geographic areas. The similarities provide a point of reference and specific connections between the case study and the illustrative example. On the other hand, the two situations have enough differences to test the Factor-Precedence Model against varying environments, different military situations, and dissimilar initial conditions. Situational differences such as the initial infrastructure levels, level of decentralization and tribal impact, and geography help to strengthen the inferences about the Factor-Precedence Model's applicability outside Iraq.

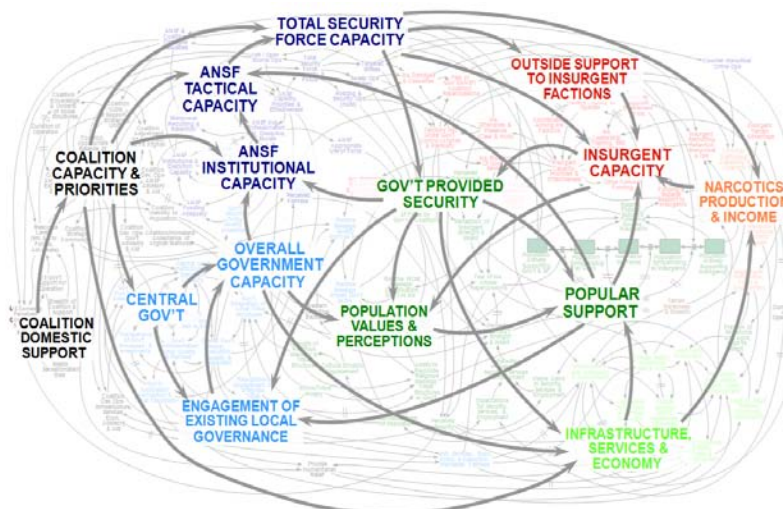
**Table 4: Controls Baghdad, Iraq (2009) to Kandahar, Afghanistan (2010)**

Situational Similarities	Situational Differences
<ul style="list-style-type: none"> <li>- Time Period (between 2009 and 2010)</li> <li>- Level of Command (MND-B equivalent [1<sup>st</sup> Cavalry] to RC-South [10<sup>th</sup> Mountain])</li> <li>- Balancing of resource priority (post-Iraq surge equal to pre-Afghanistan surge)</li> <li>- Command balance of full spectrum operations (FSO)</li> <li>- Essential services initial conditions (Damage pre-surge, limited maintenance)</li> <li>- Requirement to restore essential services</li> <li>- External influence and competition</li> <li>- International reconstruction funds</li> <li>- Same doctrine and models available</li> <li>- Religious impacts (Influence of Islam)</li> </ul>	<ul style="list-style-type: none"> <li>- Government Type and History (centralized vs. regional control)</li> <li>- Decentralization (national perspective vs. tribal focus)</li> <li>- Leadership (U.S. vs. Multi-National [ISAF])</li> <li>- Previous infrastructure levels (initial infrastructure high vs. low)</li> <li>- Education Levels to sustain projects</li> <li>- Area (geography and landscape)</li> <li>- Culture (urban vs. rural culture)</li> </ul> <p>** Major differences between case and illustrative example can be accounted for during comparison and assist in evaluation</p>

### Context and Approach

This illustrative example focuses on the hypothetical applicability of the Factor-Precedence Model in Kandahar, Afghanistan. As 2009 drew to a close, American President

Barack Obama increased the priority, troop, and resource support to Afghanistan. For the six previous years, the priority of effort and resources focused on Iraq. The drawdown of troops in Iraq facilitated the President's shift of focus and attention. To complement an American "surge" of effort, the President and Secretary of Defense petitioned and received additional support from International Security Assistance Force (ISAF) - Afghanistan partners. To complement growing ISAF and American support, President Karzai outlined his *2010 National Development Strategy* to provide basic services and sustainable development. ISAF, the U.S. Department of State, and subordinate American headquarters updated their counterinsurgency approach to reflect civilian and military integration in support of Afghanistan's government.<sup>127</sup> As outlined by Captain Pierson, ISAF's new approach led to refined lines of effort, shown below in Figure 14, and provided a guide for political and military actions. Essential services remained a major component of military operations against the insurgent and set the conditions for hypothetical application of the Factor-Precedence Model.



**Figure14: ISAF Counterinsurgency Approach for 2009 and 2010<sup>128</sup>**

<sup>127</sup> U.S. Department of State and U.S. Department of Defense, "United States Government Integrated Civilian – Military Campaign Plan (ICMCP) for Support to Afghanistan – Revision 1," Kabul, Afghanistan: U.S. Embassy Office, 2011. <http://ccportal.org/file/2238/download/3208> (accessed on February 23, 2011), 4-8.

<sup>128</sup> Pierson, 41. According to Captain Pierson's outline, essential services fell under the Infrastructure, Services, and Economy line of effort. The essential services line of effort received direct

## **Essential Services Operations and the Factor-Precedence Model**

Applying the Factor-Precedence Model to Regional Command - South operations in Kandahar, Afghanistan requires a compatible operational approach. Much like the ISAF lines of effort, the Operating Framework breaks down into six sectors including Rule of Law, Governance, Health and Education, Agriculture and Econ, Infrastructure, and Security.<sup>129</sup> To support infrastructure an essential services work, most units have used the SWEAT Model in different forms throughout Afghanistan since 2004 with varying levels of success. Because Afghanistan has limited cities and because the rural population has different needs than the specific SWEAT categories, the 16 categories offered by the Factor-Precedence Model provide an excellent starting point for reconnaissance and assessment by region. Based on the limited success of the SWEAT Model, Regional Command - South began implementation of a new Stabilization Approach in 2010 so integration of the Factor-Precedence model could prove timely.<sup>130</sup> Regional Command - South's Stabilization Approach provides a framework for alignment and coordination with the Government of the Islamic Republic of Afghanistan (GIROA). Direct coordination with the local governments simplifies the application of geographical and cultural refinement factors. Climate, population density, and economic base concerns can integrate into GIROA regional development plans to establish the essential services situation for each province and major city.

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inputs from the security, host-nation government capacity, and coalition capacity lines of effort. The essential services line of effort contributed directly to the influence of the narcotics industry and the balance of popular support for the host nation.

<sup>129</sup> U.S. Department of State and U.S. Department of Defense, "ICMCP," 32-33. According to the ICMCP, the new RC South Stabilization approach and operating framework utilizes the RC South Headquarters at Kandahar along with three Provincial Construction Teams (PRTs), 6 District Stabilization Teams (DSTs), and 12 Key Terrain Districts (KTDs) to cover a large portion of the south and central part of the country.

<sup>130</sup> Regional Command - South also has names such as Region Command - South, RC South, or RC(S) in different Afghanistan War documents. The 10<sup>th</sup> Mountain Division assumed command of the Regional Command – South area of operations in November 2010.

To ensure resources and priorities within the Regional Command – South area of operation meet needs, the precedence elements of the Factor-Precedence Model can help prioritize effort then monitor for adjustments to the commands actions. Figure 15 provides an example of Agriculture and Economic Growth Line of Operation in terms of needs, end states, actions, and priority concepts. Development in this line moves through the established phases of Shape, Clear, Hold A, Hold B, Build, and Transfer.<sup>131</sup> The command could establish an end state that takes into account current conditions outlined by the Factor-Precedence Model then prioritize projects, engagements, or local emphasis. After establishing an integrated plan, RC South could use the Factor-Precedence Model and existing tools to execute, lead, and assess progress. Based on this example, the current Regional Command South Operating Framework supports application of an essential services model like the Factor-Precedence Model.

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<sup>131</sup> Ibid. Figure 15 shows how the Factor-Precedence Model can integrate results from local reconnaissance, needs assessment, and factor refinement with existing products in Regional Command - South. Practitioners can monitor execution of projects just like RC South already does, then the practitioner can tie his or her assessment criteria into re-evaluation of local needs. Fusing the existing development plan with Factor-Precedence Model capabilities can increase sustainability with local leaders.

<b>Agriculture and Economic Growth</b>						
<b>Grievance:</b> Inability to meet basic household needs and lack of viable agricultural economic opportunity.						
<b>Endstate:</b> People have access to sustainable livelihoods. Employment opportunities are created in urban agricultural, agricultural value-added industry, public works, and municipal services enabled by reliable municipal infrastructure, vocational training and freedom of movement between rural areas and city. Economic opportunities increase the appeal of insurgent reintegration into communities.						
<b>CONCEPT</b>	The municipality will lead city-wide public works projects that build on existing plans to improve city-wide infrastructure including power, water, drainage, and roads. This work will create immediate stabilization effects by improving expectations for the future while contributing to longer-term growth in support of the economic growth sector strategy.					
<b>PRIORITY ACTIONS</b>	<b>Priority Actions</b>	<b>Sub-Actions/Activities</b>	<b>Afghan Lead</b>	<b>RC South Lead</b>	<b>Geographic Focus</b>	<b>Status</b>
	<b>Work with leaders to determine local project requests</b>	Review Afghan government plan				
		Link plan with government meetings and population needs				
		Finalize plans and put information out to the community				
	<b>Maximize power generation to key locations in city</b>	Increase total generator capacity (fuel)				
		Maximize existing power production through repair and maintenance				
		Evaluate new, sustainable power production options				
		Implement plan, hire workers, maintain for long term				
	<b>Expand municipal water infrastructure</b>	Dig community wells at points with no water access				
		Repair existing water infrastructure				
		Upgrade potable water infrastructure				
		Replace existing infrastructure				
	<b>Improve local road network in conjunction with local gov plan</b>	Repair existing priority roads				
		Replace existing infrastructure				
		Upgrade roads using labor-intensive method				
		Increase access				
		Pass out information on road and rebuilding efforts				
<b>Indicators</b>	<b>Indicators and Measurements of Success</b>					
	% of citizens who feel that local govt. can solve their problems					
	% of citizens who feel that local govt. is addressing their priority concerns					

**Figure 15: Regional Command (RC) South Stabilization Approach<sup>132</sup>**

## Results and Evaluation

Since national Afghanistan statistics on government and essential services show limited growth despite huge investments, the need for a new essential services model becomes clear. Through 2009, the SIGAR reports show that \$17.7 Billion from the Departments of Defense and State focused on narrow SWEAT-MSO categories between 2003 and 2009.<sup>133</sup> In Nangarhar alone, only 1 of 26 projects existed on the provincial development plan so projects had little support or interest from the local government.<sup>134</sup> Despite an annual increase in reconstruction dollars, a 300% increase in troop strength, and continued focus on critical lines of SWEAT-MSO,

<sup>132</sup> Ibid. The author created this product to consolidate many of RC-South's ideas and tracking products into a generic example.

<sup>133</sup> Special Inspector General for Afghanistan Reconstruction (SIGAR), "October 2010 Quarterly Report to Congress," [http://www.sigar.mil/pdf/quarterlyreports/Oct2010/Lores/SIGAR4Q\\_2010Book.pdf](http://www.sigar.mil/pdf/quarterlyreports/Oct2010/Lores/SIGAR4Q_2010Book.pdf) (accessed on November 20, 2010), 20.

<sup>134</sup> Ibid., 24.

basic services do not meet the minimum standards or provide support to the legitimate government.<sup>135</sup> Afghan crops peaked in 2005/2006 falling since, electricity jumped 400% but supports only 15% of the population, and less than 12% of the population has safe drinking water and sanitation.<sup>136</sup> Use of the Factor-Precedence Model in Regional Command - South's area of operations could improve model performance in each of the evaluation areas and help improve the focus local efforts and spending.

### **Simplicity**

The Factor-Precedence Model's implementation through the evaluation of local needs and services could improve the simplicity of essential services interactions with the Regional Command – South's Stabilization Approach. Once established, the Factor-Precedence Model could become simpler for units to execute and could tie into the existing Stabilization Approach. In Afghanistan like in Iraq, the Factor-Precedence Model could become useful to all military branches and governmental agencies tasked with civil-military support.

### **Flexibility**

The Factor-Precedence Model could allow for hasty and deliberate application during operations, a critical factor for Afghanistan. Because Regional Command - South does not use the SWEAT Model, their Stabilization Approach could benefit from integration with a holistic essential services model like the Factor-Precedence Model. The Factor-Precedence Model provides focus on geographical and cultural factors allowing support to wide areas. Factor-Precedence Model users could focus on agricultural support in one rural area of Afghanistan while providing humanitarian assistance and building housing capacity in another urban area.

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<sup>135</sup> Ibid., 58, 82, 97-102.

<sup>136</sup> Islamic Republic of Afghanistan, *Afghanistan National Development Strategy (2008-2013): A Strategy for Security, Governance, Economic Growth, and Poverty Reduction* (Kabul, Afghanistan: Afghanistan National Development Strategy Secretariat, 2009), 10-15.

## **Reproducibility**

Like in Iraq, the Factor-Precedence model seems reproducible in Afghanistan. Regional Command – South’s integration with local government agencies increases the options for systematic execution and reduces inconsistencies in application. Since implementing their Stabilization Approach, RC South has leveled spending on infrastructure outside the SWEAT-MSO categories.<sup>137</sup> Diversification of spending and project prioritization has increased the ability to focus on critical needs and expectations of the public.

## **Sustainability**

The Factor-Precedence Model could provide focus on geographical and cultural factors allowing support to both rural and urban areas in Afghanistan. The model could readily integrate into the existing Regional Command – South’s Stabilization Approach and with Region South’s diplomatic *Unified Plan*. Because Regional Command – South already integrates with local government and leaders, those leaders can motivation for Afghani government employees and contract workers to learn the systems and maintain them properly. The chances of sustainable improvements over time increases greatly with local interest and buy in.

## **Links to Political and Military Objectives**

The Factor-Precedence Model could facilitate focus on the critical problems identified by both the political and military leadership. In this Afghanistan example, the Factor-Precedence Model could help integrate essential services objectives related to the ISAF Operational Approach, President Karzai’s *National Development Strategy*, and Regional Command – South’s Stabilization Approach. The cost-benefit analysis conducted using the Factor-Precedence Model could also prove useful in political end state assessment and adjustments to military actions.

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<sup>137</sup> SIGAR, 97.



## **Inferences for Future Factor-Precedence Model Application**

Can these two case studies and the illustrative example facilitate inferences for the future? Yes, the examples show that the Factor-Precedence Model not only proves more effective than existing models, but the Factor-Precedence Model can also apply in locations the SWEAT Model could not support. Military units must use a valid and effective model that applies historical and regional factors early in the process for a locally refined categorization, allows for a fluid prioritization of the refined categories, and facilitates a continuous assessment of the model to link needs and changes to military objectives. Despite the differences in culture, government, geography, and requirements between Iraq and Afghanistan, the holistic nature of the Factor-Precedence Model could facilitate effective essential services improvements in both locations. The fact that the Factor-Precedence Model can apply in a variety of locations bodes well for future application.

In addition to demonstrating effectiveness in multiple locations, the case studies show that the Factor-Precedence Model could work with military tools during current and future operations. A variety of existing military tools tie directly into the Factor-Precedence model during execution. Figure 16 (Section 4) shows the nesting of existing tools with the primary components of the Factor-Precedence Model. Refined categorization directly links to establishing lines of effort within the essential services or economic lines of operation. Each refined categorization directly supports establishment of decisive points, key tasks, or key events required to meet end states and unit objectives. Using the categories within the Factor-Precedence Model, engineers, civil affairs, and diplomatic specialists can conduct long-term, mid-term, and short-term master planning of budgets, projects, and efforts to restore essential services more effectively. The Factor-Precedence model provides priority by essential service category and can thus assist in the development of projects lists along with the subsequent prioritization and

budgeting of said projects. Continuous assessment within the model allows for adjustment of categories, use of military provided assessment tools, and reprioritization of effort.

## 7 – Conclusions and Recommendations

*“Success will be less a matter of imposing one’s will and more a function of shaping behavior of friends, adversaries, and most importantly, the people in between.”<sup>138</sup>*

- Robert Gates, U.S. Secretary of Defense  
October 10, 2007

*“If you know the enemy and know yourself you need not fear the results of a hundred battles.”<sup>139</sup>*

- Sun Tzu

Results matter. The model that provides more flexibility, allows for repetition in a variety of situations, and links better to military objectives will prove more effective during counterinsurgency operations. Not only does the Factor-Precedence Model perform better than the SWEAT and other models in Iraq and Afghanistan’s counterinsurgency fights, but the Factor-Precedence model seems more effective in future fights as well. Because future requirements will undoubtedly develop, military planners should adopt a holistic approach like the Factor-Precedence Model and incorporate existing intelligence and analysis tools into the model. Further research can improve the application of culture, climate, and geography factors. Commander requirements can guide the prioritization elements within the Factor-Precedence model, and practitioners can incorporate existing project and area assessment capabilities into model execution.

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<sup>138</sup> Robert Gates, “Landon Lecture Series Secretary of Defense Speech,” Kansas State University Landon Lecture (26 November 2007). Washington, DC: Office of the Assistant Secretary of Defense (Public Affairs), 2007, 1. <http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1199> (accessed December 7, 2010).

<sup>139</sup> Valentina Taddeo, “U.S. Response to Terrorism: A Strategic Analysis of the Afghanistan Campaign,” *Journal of Strategic Security*, 3 (2010): 27-38. <http://scholarcommons.usf.edu/cgi/viewcontent.cgi?article=1010&context=jss> (accessed January 25, 2011), 27.

## Conclusions

The SWEAT Model has provided a valuable tool for essential services restoration since 2004, but the military requires change to improve counterinsurgency outcomes. Since the SWEAT Model has widespread use, many commanders, practitioners, and even doctrine confuse the SWEAT Model categories with the exact meaning of essential services. The existing infrastructure categories provided by the SWEAT Model form an excellent foundation for essential services analysis, but a new model and updated doctrine can leverage the best parts of the SWEAT Model to increase effectiveness of restoration operations. Because the SWEAT Model's categories align with existing engineer career fields and because they represent the civil service offices formed in most countries, future essential services models should encourage category use and analysis.<sup>140</sup> Essential services and basic needs differ for each geographical region and cultural area. Understanding and focusing on area-specific needs has become a major weakness of the SWEAT Model and should become an important part of any essential services model placed in future doctrine.

Based on the five evaluation criteria for model effectiveness, the Factor-Precedence Model proves more effective than existing models. The Factor-Precedence Model has grounding in doctrine, takes into consideration the local environment, and fits well into existing operations processes. The Factor-Precedence Model utilizes many of the strong points of existing models to make an effective model that works in both Iraq and Afghanistan. Given the case studies and examples covered in this monograph, there seems a good chance that the Factor-Precedence Model could prove effective in future counterinsurgencies against "hybrid threats" and, with minor model adjustments, could work in situations other than counterinsurgency.<sup>141</sup>

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<sup>140</sup> Michael R. Lindeburg, *Civil Engineering Reference Manual for the PE Exam, 11th Edition*. Belmont, CA: Professional Publications, Inc. (PPI), 2008, Introduction.

<sup>141</sup> FM 3-07, 1-20. Hybrid threats use a variety of approaches to fighting. According to the FM, the Second Lebanon War of 2006 highlighted hybrid warfare by Hezbollah against Israel. A key take-away,

## Recommendations for Future Action

1. As outlined earlier, many practitioners think SWEAT means essential services. Leaders should avoid confusing the SWEAT acronym with the real definition of essential services by discontinuing the use of the SWEAT family of acronyms.
2. The essential services definition seems very vague. Doctrine writers should refine the definition of essential services in FM 3-07 and FM 3-24 to encourage a holistic approach to meeting people's needs while implementing the essential services tasks and logical line of operation.
3. The current SWEAT Model, along with the other primary existing essential services and infrastructure models, focuses exclusively on infrastructure repair and project execution. These models exclude Civil Affairs and interagency partners who prefer to address capacity and development in restoration models. To increase the military inter-branch and government interagency applicability of essential services restoration, leaders should:
  - Implement a more holistic approach like the Factor-Precedence Model to facilitate synergy between Engineer and Civil Affairs approaches.
  - Incorporate the Factor-Precedence Model into doctrine and training for Army and Marine Reserve and National Guard force structures to leverage their unique capabilities and civilian experience. In addition, the new model could encourage an interagency approach focused not only on projects but also actions, engagements, and development. Department of State guidance could integrate the new model.
4. Many tools exist that could work with the Factor-Precedence Model. Military planners should adopt a holistic approach like the Factor-Precedence Model and incorporate

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against outside the scope of this monograph, is that the restoration of essential services exists during major combat, counterinsurgency, or humanitarian assistance operations; therefore, the Factor-Precedence model could prove useful in situations other than counterinsurgency.

- existing intelligence and analysis tools into the model. Over time, practitioners could improve the application of existing tools with Factor-Precedence Model.
5. Since the scope of this monograph focused on counterinsurgency operations, practitioners should conduct further research to improve the application of culture, climate, and geography factors for all essential services model. Additional research could identify ways to modify the Factor-Precedence Model to meet interagency guidance along with emerging doctrinal requirements.
  6. After additional research, refinement, and study by U.S. Army Engineer School and Engineer Research and Design Center, units can assess the benefits of the Factor-Precedence Model and integrate the model into their operational approach.

## Appendix 1: Definitions and Terms

The following appendix provides definitions for key words and phrases contained in this monograph. To provide a common point of reference for readers, most terms begin with the military's doctrinal definition and refine the use in this monograph.

**Civil Considerations** – areas, structures, capabilities, organizations, people, events (ASCOPE) within a commander's battlespace that are not normally considered militarily significant. (Field Manual [FM] 5-0, pg C-7)

**Counterinsurgency (COIN)** – those military, paramilitary, political, economic, psychological, and civic actions taken by a government to defeat insurgency. (FM 3-24, Glossary 4)  
Comprehensive civilian and military efforts taken to defeat an insurgency and to address any core grievances. Also called **COIN**. (Joint Publication [JP] 1-02, pg 108) Counterinsurgency or counterinsurgents can refer to the group itself.

**Essential Services** – those things needed to sustain life, such as food, water, clothing, shelter, and medical treatment. Stabilizing a population requires meeting these needs. People pursue essential needs until they are met, at any cost and from any source. People support the source that meets their needs. If it is an insurgent source, the population is likely to support the insurgency. If the host nation government provides reliable essential services, the population is more likely to support it. Commanders therefore identify who provides essential services to each group within the population. (FM 3-24, pg 3-11) Also called **ESS** by practitioners.

**Guerilla** – person who engages in irregular warfare (guerilla warfare) especially as a member of an independent unit carrying out harassment and sabotage. (Trinquier, pg 6). Although used interchangeably to describe insurgents or terrorists during the Malaya Emergency and other conflicts, a guerilla is specifically one who engages specifically in guerilla warfare to achieve his or her goals. Guerillas could fight during insurgencies or major combat operations.

**Host nation** – a nation which receives the forces and/or supplies of allied nations and/or NATO organizations to be located on, to operate in, or to transit through its territory. Also called **HN**. (JP 1-02, pg 212)

**Infrastructure** – includes all “real property” (i.e., buildings, roads, facilities, etc) constructed to support a society. Infrastructure spans the spectrum of those structures and services that enhance a life style to those that make survival possible. (NTC SWEAT Smart Book, pg 3)

**Insurgency** – the organized use of subversion and violence by a group or movement that seeks to overthrow or force change of a governing authority. Insurgency can also refer to the group itself. (JP 1-02, pg 229) An organized movement aimed at the overthrow of a constituted government through the use of subversion and armed conflict. (FM 3-24, pg Glossary 5)

**Lines of Effort** – a useful tool for framing the concept of operations when stability or civil support operations dominate. Lines of effort link multiple tasks with goal-oriented objectives that focus efforts toward establishing end state conditions. (FM 5-0, pg 2-17) Also called **LOEs**.

**Mission Variables** – mission, enemy, terrain and weather, troops available and support available, time available, and civil considerations (METT-TC) provide categories of relevant information to synthesize operational variables and tactical-level information with local knowledge about conditions relevant to their mission. (FM 5-0, pgs 1-21 and 1-71)

**Nation-Building** – involves the use of armed force as part of a broader effort to promote political and economic reforms with the objective of transforming a society emerging from conflict into one at peace with itself and its neighbors. (Dobbins, pg xvii)

**Operational Variables** – political, military, economic, social, infrastructure, information, physical environment, and time (PMESII-PT) factors describe the commander's understanding of the battlefield. (FM 5-0, pg 1-6)

**Practitioner** – for the purpose of this monograph, the term practitioner refers to someone, either military or diplomat, who engages in the study, improvement, or management of essential services. The term unit and practitioner are used interchangeably in this monograph. In the military, most essential services practitioners come from engineer or civil affairs fields.

**Reconstruction** – the process of rebuilding degraded, damaged, or destroyed political, socioeconomic, and physical infrastructure of a country or territory to create the foundation for long-term development. (FM 3-07, pg 1-12)

**Smart Book (also Smartbook)** – a useful resource document or reference guide that informs the reader and thus increases his or her ability to accomplish a task in the military. Readers should not confuse the military smart book with electronic smart books, smart phones, or electronic mobile devices.

**Stability Operations** – Stability operations is defined as an overarching term encompassing various military missions, tasks, and activities conducted outside the United States in coordination with other instruments of national power to maintain or reestablish a safe and secure environment, provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief.” (DoDD 3000.05, pg 4) Stability operations encompass the various military missions, tasks, and activities conducted outside the United States in coordination with other instruments of national power to reestablish or maintain secure environment, provide essential governmental services, emergency infrastructure reconstruction, and humanitarian relief. (FM 3-07, pg Glossary-9)

**Stabilization** – the process by which underlying tensions that might lead to resurgence in violence and a breakdown in law and order are managed and reduced, while efforts are made to support preconditions for successful long-term development. Together, reconstruction and stabilization comprise the broad range of activities defined by the Department of Defense as stability operations. (FM 3-07, pg 1-12)

**Terrorism** – terrorism is politically-motivated violence, directed primarily against civilians or non-combatants, undertaken with the intention to coerce societies through fear. (Kilcullen, *Countering Global Insurgency*, pg Appendix D-1)

## Appendix 2: Acronyms in Essential Services

AR	Army Regulation
ASCOPE	areas, structures, capabilities, organizations, people, events
BCT	Brigade Combat Team
CCIR	commander's critical information requirement
CERP	commander's emergency relief program
CERL	Construction Engineering Research Laboratory
CMO	civil-military operations
COCOM	combatant command
COIN	counterinsurgency
CORDS	Civil Operations and Revolutionary Development Support
DA	Department of the Army
DoD	Department of Defense
DoDD	Department of Defense Directive
DoDI	Department of Defense Instruction
ERDC	Engineer Research and Development Center
ESS	essential services
FM	Field Manual
FMI	Field Manual Interim
GAO	Government Accounting Office
GCAT	Geo-Cultural Assessment Tool
GIRoA	Government of the Islamic Republic of Afghanistan
GOI (or GoI)	Government of Iraq
HES	Hamlet Evaluation System
HIC	high intensity conflict
IO	information operations
IPB	intelligence preparation of the battlefield
IR	infrastructure reconnaissance
ISAF	International Security Assistance Force
ISR	intelligence, surveillance, and reconnaissance
JOPP	Joint Operation Planning Process
JP	Joint Publication
LIC	low intensity conflict
LOE (or LoE)	lines of effort
LOO (or LoO)	lines of operation
MDMP	military decision making process



METT-TC	mission, enemy, terrain and weather, troops available and support available, time available, and civil considerations
MCWP	Marine Corps Warfighter Pamphlet
MNC-I	Multi-National Corps - Iraq
MND-B	Multi-National Division - Baghdad
MND-N	Multi-National Division - North
MNF-I	Multi-National Force - Iraq
MOE	measure of effectiveness
MOOTW	military operations other than war
MOP	measure of performance
OSD	Office of the Secretary of Defense
PIR	priority intelligence requirement
PMESII-PT	political, military, economic, social, infrastructure, information, physical environment, and time
PRT	Provincial Reconstruction Team
RC-E or RC(E)	Regional Command – East
RC-S or RC(S)	Regional Command – South
SBCT	Stryker Brigade Combat Team
S/CRS	Office of the Coordinator for Reconstruction and Stabilization
SIGAR	Special Inspector General for Afghanistan Reconstruction
SIGIR	Special Inspector General for Iraq Reconstruction
SF	Special Forces
SSTR	stability, security, transition, and reconstruction
SWEAT	sewer/sewage/sanitation, water, electricity, academics, trash
SWEAT-MSO	sewer, water, electricity, academics, trash, medical, safety, other considerations
SWET-H	sewer, water, electricity, trash, health
TCAPF	Tactical Conflict Assessment and Planning Framework
TO	Theater of Operations
U.S.	United States
USACE	United States Army Corps of Engineers
USAES	United States Army Engineer School
USAID	United States Agency for International Development

## Appendix 3: Modern Counterinsurgency Operations and Essential Services Key Events

In the modern era, insurgency actions by China and counterinsurgency actions by the United States, France, and Great Britain highlight the development of counterinsurgency thought, techniques, and doctrine. Each counterinsurgency conflict offers lessons to military planners, doctrine writers, and essential services practitioners. By 2006, the American Army had taken critical lessons learned and formulated them into a coherent doctrine in the form of *FM 3-24 Counterinsurgency* and *FM 3-07 Stability Operations*. Both of these manuals focus considerable effort on the restoration of essential services to support the host nation government and gain the support of the population.

The first section of this appendix provides an overview of foreign counterinsurgency lessons that helped counterinsurgency literature and doctrine evolve over time. Table 5 provides a historical overview of lessons learned from foreign counterinsurgency involvement.

**Table 5: Modern (Post 1942) Foreign Counterinsurgency Lessons**

Years	Conflict	Historical Relevance
1927-1950	<b>Chinese Civil War</b>	Since the early 20 <sup>th</sup> Century, winning support of the populace has become a fundamental principle in counterinsurgency literature. In 1937, while developing his theories of Chinese Communism, Mao Tse-Tung stated that “[b]ecause guerrilla warfare basically derives from the masses and is supported by them, it can neither exist nor flourish if it separates itself from their sympathies and cooperation.” <sup>142</sup> He later successfully applied these principles during the Chinese Civil War that led to the overthrow of the Republic of China and instatement of Communism.
1948 to 1960	<b>Malayan Emergency</b>	Great Britain waged a low cost, long term counterinsurgency effort in Malaya. Great Britain’s comprehensive essential services program tied into comprehensive security efforts, helped lead to a stable Malaysian government, and cost less than \$800 million. <sup>143</sup> In 1952, while fighting communist insurgents during the Malayan Emergency, General Sir Gerald Templer linked winning the “hearts and minds” of the Malayan people with improving popular perception and counterinsurgency success.

<sup>142</sup> Samuel Griffith, *Mao Tse-Tung On Guerrilla Warfare* (Baltimore, MD: The Nautical & Aviation Publishing Company of America, 1992), 71.

<sup>143</sup> Kalev Sepp and John Nagl provide outlines of British efforts in Malaya, the history, and lessons learned. See Kalev Sepp, “Best Practices in Counterinsurgency.” *Military Review* (May-June 2005): 10 for a conflict review and best practices. See also John A. Nagl, *Learning to Eat Soup With a Knife: Counterinsurgency Lessons from Malaya and Vietnam*. Chicago, IL: University of Chicago Press, 2005 for a comprehensive book on the conflict and French lessons learned.

Years	Conflict	Historical Relevance
1954 to 1962	<b>Algerian War</b>	France conducted an unsuccessful counterinsurgency effort in Algeria. French forces failed to gain popular support because they focused too heavily on harsh security tactics and had limited “Special Administration Sections” aimed at improving conditions. <sup>144</sup> In 1966, after taking part in the Algerian War as a counterinsurgent, David Galula stated “the support of the population is as important for insurgents as it is for counterinsurgents.” <sup>145</sup> Literature published since the beginning of America’s conflicts in Afghanistan and Iraq carries the same theme. In 1966, after taking part in the Algerian War as a counterinsurgent, David Galula stated “the support of the population is as important for insurgents as it is for counterinsurgents.” <sup>146</sup> Literature published since the beginning of America’s conflicts in Afghanistan and Iraq carries the same theme.
1957	<b>Foreign COIN Review</b>	FM 41-10, <i>Civil Affairs Military Government Operations</i> , proposed that insurgencies flourished in conditions of “disorder and socioeconomic hardship” therefore military units must help restore basic infrastructure, services, and humanitarian standards. FM 41-10 estimated that restoring basic services would “win public support for the government and the Army.” <sup>147</sup>

The second section of this appendix relates America’s involvement in conducting restoration or provision of essential services to the prevention or counteraction of an insurgency. Table 6 provides a historical overview of American involvement in essential services restoration during and after World War II. These experiences highlight not only the historical precedence of essential services restoration, but they also show the evolution to modern essential services models.

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<sup>144</sup> Bertrand Valeyre and Alexandre Guerin, “From Galula to Petraeus: The French Legacy in the US Counterinsurgency Doctrine.” *Cahier de la Recherche Doctrinale* (Christine Valley, France: Centre de Doctrine d’Emploi des Forces (CDEF), 2010), 10-12; Galula, 89. Frenchmen Bertrand Valeyre, Alendre Guerin, and David Galula provide great information on France’s efforts in Algeria. Both books provided critical lessons information concerning the conflict along with French military and political lessons learned.

<sup>145</sup> Galula, 74.

<sup>146</sup> Ibid..

<sup>147</sup> Andrew J. Birtle, *U.S. Army Counterinsurgency and Contingency Operations Doctrine 1942-1976*. Washington, D.C.: Center of Military History, 2007, 148. CMH outlines the history of recent U.S. Counterinsurgency operations and doctrine. Throughout the book, it refers to guerillas in the same way modern doctrine refers to insurgents.

**Table 6: Modern (Post 1942) American Essential Services Efforts during Counterinsurgency Operations**

Years	Conflict	Historical Relevance
1944-1946	<b>World War II Germany and Japan</b>	Starting heavily in 1945, the United States Army built a history of doctrine and missions that focused on meeting needs and fixing basic services. Lieutenant General Lucius D. Clay in Germany and General of the Army Douglas MacArthur in Japan received the requirements as soldier-diplomats to restore and provide basic governmental services to prevent growth of a Communist insurgency. <sup>148</sup>
1959	<b>Cuba and Columbia</b>	Starting in 1959, President Eisenhower responded to political and social unrest in Cuba and Columbia by appropriating \$500 Million and military support to restoring health, education, and agrarian conditions in both countries. <sup>149</sup> These interventions focused on supporting the host-nation government's legitimacy and maintaining a stable partner.
1965	<b>Dominican Republic</b>	In 1965, 1,600 soldiers from the 82 <sup>nd</sup> Airborne Division deployed in a multi-national effort to the Dominican Republic to restore municipal services, repair roads, build schools, and assist with medical care in the face of an insurgency there. <sup>150</sup> The focus of preventing the spread of Communist insurgencies and Communist rule in South America increased in the Dominican Republic based on the island nation's proximity to the United States.
1955 to 1975	<b>Vietnam War</b>	The United States fought in the Vietnam War against Communist conventional troops and guerrilla forces. The U.S. Army implemented two systems, the Hamlet Evaluation System (HES) and the Civil Operations and Revolutionary Development Support (CORDS), which had positive infrastructure impacts and would establish the foundation for future counterinsurgency and essential services models. <sup>151</sup> Success in meeting basic needs of the populace led, in turn, to improved intelligence that facilitated an assault on the Viet Cong political infrastructure. By early 1970, statistics indicated that 93 percent of South Vietnamese lived in "relatively secure" villages, an increase of almost 20 percent from the middle of 1968. By 1972, pacification had largely uprooted the insurgency from among the South Vietnamese population and forced the communists to rely more heavily on infiltrating conventional forces from North Vietnam and employing them in irregular and conventional operations. <sup>152</sup>

<sup>148</sup> Ibid., 14.

<sup>149</sup> Ibid., 291 and 299.

<sup>150</sup> Ibid., 208-209.

<sup>151</sup> A. J. Langguth, *Our Vietnam: The War, 1954-1975* (New York, NY: Simon and Schuster, 2000), 15; Jacob Kipp, "The Human Terrain System a CORDS for the 21st Century," *Military Review* 86, no. 5 (September-October 2006): 8-15, 11. American stability and essential services operations in Vietnam played a large part in modern counterinsurgency operations. CORDS and HES became components of an effective pacification campaign that improved late-war situations but failed to overcome political pressure for withdrawal.

<sup>152</sup> FM 3-24, 2-13.

Years	Conflict	Historical Relevance
2001 to present	<b>Operation Enduring Freedom (OEF)</b>	Counterinsurgency operations in Afghanistan continued to show the relevance of essential services restoration and the need for effective ways to improve it. In Afghanistan, the limited initial infrastructure, tribal focus, and the cultural self-sufficiency of Afghani populace limited the impact of services restoration and support to the central government. <sup>153</sup> Based on the reoccurring theme and guidance to conduct stability operations, the restoration of essential services will remain a future mission.
2003 to 2010	<b>Operation Iraqi Freedom (OIF)</b>	Essential services restoration became a major line of effort for forces in Iraq. Many units like 1 <sup>st</sup> Cavalry Division in 2005 put non-kinetics efforts like essential services above kinetic requirements to defeat insurgents. A variety of models emerged during operations including the most frequently used, the SWEAT Model. <sup>154</sup> This monograph outlines the Factor-Precedence Model which closely resembles 1 <sup>st</sup> Cavalry Division's model used in 2009 near the end of the surge.
2010 to present	<b>Operation New Dawn (OND)</b>	As operations shift in Iraq to advise and assist tasks, the need for essential services restoration and support continues to develop. Effective military models will need to act in support of host nation and Department of State efforts. These efforts will have limited resources for action.

Figure 17 provides additional examples from Australian counterinsurgency specialist David Kilcullen on useful counterinsurgency programs and efforts by the British and United States that shaped thinking today.

Insurgency	Counterinsurgency methods	Types of attack	Comments
Malaya 1948-60	Resettlement program Use of surrendered enemy personnel (SEPs) Special forces deep penetration patrols Framework security operations Key infrastructure protection Hearts and Minds Program Political concessions to independence	3, 4, 5 1, 2 1,2,3 4,5,6 4 5,6 5	Measures covered a good spread of methods. These were initially ill coordinated but improved dramatically with central coordination. Socio-political measures became effective once security measures began to 'bite'.
Darul Islam, Indonesia 1948-62	Pagar betis (civilian cordon operations) Village Defence Organisation P4K (pacification) strategy Civic action programs Decapitation strikes RPKAD deep penetration patrols Infrastructure/route security ops	2,3,4,5,6 3,4,5 1,2,3,4,5 5,6 1 1,2 2,3,4	Measures addressed most areas, with a preference for coopting civil populations, harsh collective punishments and decapitation strikes. Most successful in 1959-62 when integrated at theatre level.
Vietnam 1959-73	Strategic hamlet program Phoenix Program CORDS program Combined Action Platoons (CAP) Search and Destroy / Sweep and Clear ops Interdiction of supply routes (HCM trail, Rung Sat, Mekong Delta) Sanctuary denial ops (DMZ, Cambodia) Montagnard Strike force operations Pacification operations Winning Hearts and Minds (WHAM)	3,4,5 1,2 2,3,4,5 3,4,5,6 1,2 2, 5 5 1,2,3,4,5 3,4,5,6 5,6	Somewhat counter-intuitively, Vietnam War methods appear to address the full spread of attack methods, with those actions (CORDS, CAP, Montagnard ops) that address most issues being most effective. Coordination was initially poor but improved dramatically in 1968-72.

**Figure 17: Kilcullen's Summary of Historical Counterinsurgencies<sup>155</sup>**

<sup>153</sup> SIGAR, 97.

<sup>154</sup> Fullerton and Myers, 4-5.

<sup>155</sup> Kilcullen, "Countering Global Insurgency," *Small Wars Journal* (NOV 04), Richmond, VA: Small Wars Foundation LLC, 2004. Available at <http://smallwarsjournal.com/documents/kilcullen.pdf>. Accessed on 20 NOV 10, 33.

## Appendix 4: Current Essential Services Models

This appendix outlines the major essential services restoration models available at the time of this monograph. Models under development have draft information highlighted. Figures 18 to 22 outline the major models used by practitioners to restore essential services in a counterinsurgency environment. Each figure contains details on the model, a picture of the model's cover page, and examples of critical elements of the model.

### **SWEAT Smart Book**

National Training Center (NTC) Practical Applications for Deploying Units V3.0

Year: 2005

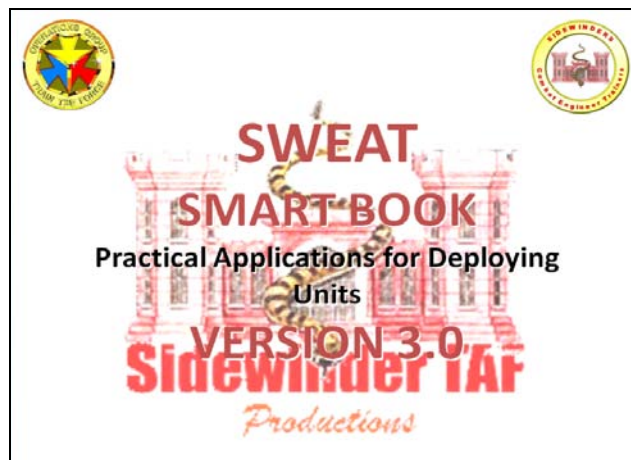


Figure 18: NTC SWEAT Smart Book Cover<sup>156</sup>

#### **Model Summary:**

- Developed by the NTC Engineer Sidewinder Team between 2004 and 2005 to train deploying units on SWEAT applications in a deployed environment
- One of the first publications covering a version of the SWEAT Model
- Stand alone Smart Book to facilitate infrastructure reconnaissance and data collection
- Prioritization of issues and projects became critical to model's success
- Heavily used in development of doctrinal SWEAT Model
- Refined many of the categories still in use today

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<sup>156</sup> *SWEAT Smart Book*, 1-33. Figure 18 shows the NTC SWEAT Smart Book's digital cover.

INFRASTRUCTURE INFORMATION & DATA COLLECTION (I <sup>2</sup> DC)	
<p><b>Purpose</b></p> <p>This document provides a basic understanding of the major infrastructure components involved with recovery and sustainability operations. It is intended for use as a "stand alone" instrument by individuals not trained in engineering or recovery operations. Through an awareness of "infrastructure", based on use of this document, any individual in an area of operations becomes a potential reconnaissance asset.</p> <p>The value of infrastructure reconnaissance is not only the identification of a problem, but providing the relevant information necessary for planning and reconstruction by those skilled in an appropriate specialty. In addition to information gathering, a basic understanding of how infrastructure operates and the associated difficulties in repair can guide tactical operations and operational decision making so as to minimize the resources (time, people, funds) required to reestablish "normalcy" upon the conclusion of hostilities.</p> <p>This document provides an "initial" data collection standard corresponding to an individual with little experience with the design and function of infrastructure. Consequently, the recipient of the collected infrastructure data (brigade or higher headquarters) should possess a basic level of infrastructure understanding to efficiently prioritize, request, and interpret data collected.</p> <p><b>Infrastructure Categories</b></p> <p>Infrastructure includes all "real property" (i.e., buildings, roads, facilities, etc) constructed to support a society. Infrastructure spans the spectrum of those structures and services that enhance a life style to those that make survival possible. Within this spectrum, infrastructure can be subdivided into the following unprioritized categories.</p> <ul style="list-style-type: none"> <li>Sanitation (WW) (Wastewater Treatment)</li> <li>Water Supply (WS)</li> <li>Energy (EN) (electrical power production, bulk fuel storage and distribution)</li> <li>Trash (SW) (Solid and Hazardous Waste Disposal)</li> <li>Transportation (TR) (highways, railroads, airports, waterways)</li> <li>Telecommunications and Media (TM) (cellular service, telephone service, commercial radio, television)</li> <li>Agriculture (AF) (farmland, irrigation systems, distribution systems)</li> <li>Buildings and Structures (BS) (political offices, records facilities, financial institutions, academic buildings, police stations, industry complexes, public housing)</li> <li>Chemical Industry and HAZMAT (HA)</li> </ul>	<ul style="list-style-type: none"> <li>Cultural or Historical (CH) (places of worship, locations of historical or cultural significance)</li> <li>Public Health and Safety (PH) (hospitals, clinics, firefighting)</li> </ul> <p><b>Prioritization</b></p> <p>Resources to deal with infrastructure issues are always in short supply. Whether the issue is time and people to conduct a reconnaissance or funding for materials to restore a facility, prioritization of effort is necessary. Final prioritization is always governed by the specifics of a given situation, but in the absence of detailed analyses, the following prioritized general criteria can be applied.</p> <ol style="list-style-type: none"> <li>Effort – The amount of expertise required to repair or replace a facility or operation; or the availability and transportation required for repair or replacement of specialty equipment.</li> <li>Health and Safety – The magnitude of impact a task has on the health and safety of a population.</li> <li>Cost – The monetary cost to repair or replace a particular type of facility or operation.</li> <li>Local Perception – Perceived importance by the local population.</li> <li>Self-governance – The level of impact that the loss of function by a facility or operation has on the continued or resumption of self-governance (e.g., municipal facilities, medical facilities, police stations, media centers, etc) in an area.</li> <li>Interdependence – The interdependence of this item with the completion of other tasks, subcategories, or categories of infrastructure activities.</li> </ol> <p>The application of these criteria within the infrastructure categories presented yields the following prioritized list of infrastructure components. The acronym LSC refers to the specific action(s) required, where L is locate, S is secure, and C is collect data.</p> <ol style="list-style-type: none"> <li>Bridges or tunnels with no bypass (L,S,C)</li> <li>Electrical Power Generation (L,S,C)</li> <li>Potable water supply (L,C)</li> <li>Religious Centers (L)</li> <li>Trash Removal</li> <li>Airports/Airfields/Heliports (L,S,C)</li> <li>Sewage treatment (L,C)</li> </ol> <p><b>Assessment</b></p> <p>The process of assessing the condition, adequacy, and repair requirements for infrastructure is complicated and requires technical expertise and experience. The use of the following infrastructure descriptions and checklists do not provide these prerequisites.</p> <p>This document does provide a guideline for data collection that can facilitate a technical evaluation of an infrastructure's condition and adequacy. However, the final determination of</p>

Figure 19: NTC SWEAT Smart Book Overview<sup>157</sup>

- Developed an infrastructure rating scheme for measures of performance, priority, and effectiveness
- 

Infrastructure Rating Scheme (2 of 5)				
Area	Green	Amber	Red	Black
Power	power system works; only black outs are planned	power system works; black outs unplanned	power system not reliable, broken	power system destroyed
	electric lines are up 100%, no damage, no energy loss	electric lines are up at least 50%, some damage, some line deterioration, can't determine pwr loss	Some electric lines down greater than 50%; majority of lines deteriorated; power loss seen	Electric lines are all down; hot wires; power loss
	Power grid station intact; secureable	Power grid station working; not securable	power grid station not working; not securable; looted	power grid station stripped; destroyed
Trash	trash collection system exists; works	trash collection exists but limited	no formal trash collection	no trash collection; trash stays
	trash put in an area that is not a health issue	not known where trash is dumped	trash is consolidated in a place that could be a health issue	trash is consolidated in a place that is a health issue
	public facilities do not have a trash problem	public facilities do have trash; but it is cleaned-limited	public facilities have no means to remove trash	public facilities have trash; not removed
Housing	residences are structural sound and offer protection from the environment	residences are damaged, need eval for structural; limited protection from environment	residences are damaged; not structural sound; should not be occupied	residences destroyed; not habitable
	utlites are working; reliable	utlities work over 50% of time; not reliable	utlities work under 50% of time; broken	utlities destroyed

Figure 20: NTC SWEAT Smart Book Overview<sup>158</sup>

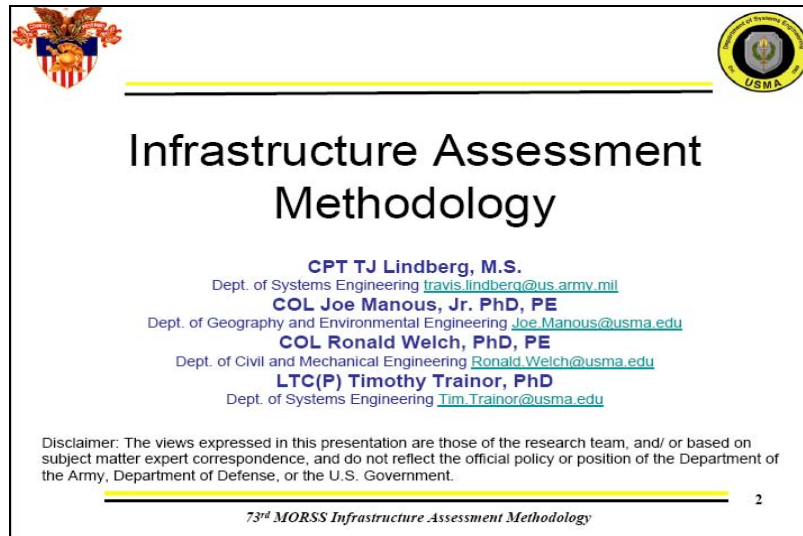
<sup>157</sup> SWEAT Smart Book, 3.

<sup>158</sup> SWEAT Smart Book, 109. The SWEAT Smart Book provides several measures of performance that compare the specified infrastructure category with generally acceptable levels of performance or output.

## **Infrastructure Assessment Methodology**

United States Military Academy (USMA) Infrastructure Assessment Methodology

Year: 2005



**Figure 21: USMA Infrastructure Assessment Methodology Cover Page**<sup>159</sup>

### **Model Summary:**

- Developed by USMA Department of Systems Engineering in concert with the USAES and ERDC's Construction Engineering Research Laboratory (CERL)
- Team focused on "Theater of Operations (TO) infrastructure security, assessment, and repair (re-build)"(MORRS, 12)
- Original analysis based on study of domestic critical infrastructure
- Flexible, adaptable, scalable tool for use on contingency operations worldwide.
- Placed emphasis of the process on infrastructure projects and priority.
- Recommended categories used in The SWEAT/IR and NTC SWEAT Smart Book
- Became critical in the development of the doctrinal SWEAT Model
- Figure 22 shows the major contribution of the team's research: a revised infrastructure category list

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<sup>159</sup> Lindberg, et al, 2-33.



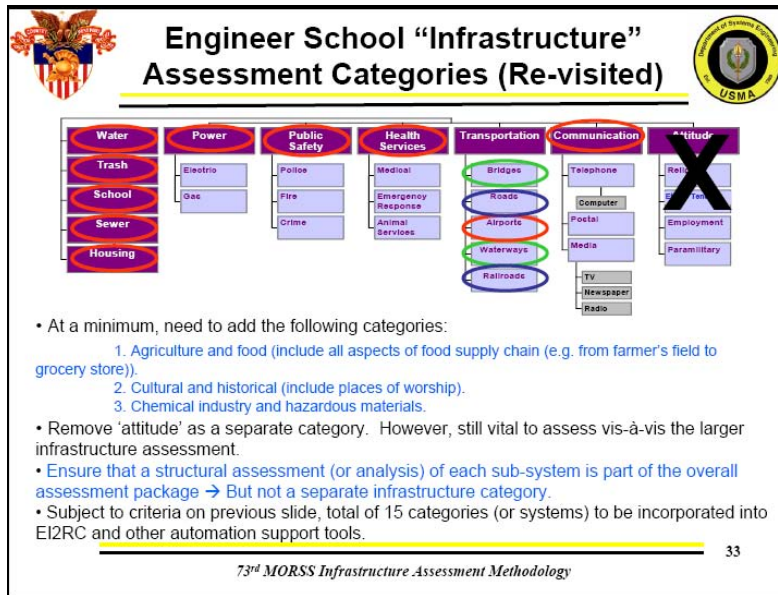


Figure 22: USMA Infrastructure Assessment Methodology Cover Page<sup>160</sup>

## The SWEAT/IR Book

United States Army Engineer School (USAES) Infrastructure Reconnaissance Version 2.1

**Note:** Version 2.1 of The SWEAT/IR Book is unclassified but marked For Official Use Only (FOUO). To maintain a fully unclassified monograph, this appendix will only cover the book's origination and generic content.

**Year:** 2005

**Cover:**

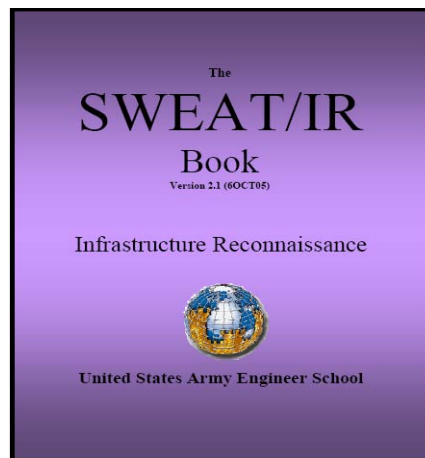


Figure 23: USAES SWEAT/IR Book Cover<sup>161</sup>

<sup>160</sup> Lindberg, et al, 33.

<sup>161</sup> *The SWEAT/IR Book*, 1-8. Because the USAES has deemed the technical contents and several images within this book Unclassified – For Official Use Only (FOUO), the author has limited the use of the use of this source. This monograph contains no FOUO information. Because the *SWEAT/IR Book* provides such utility in the field, practitioners can find digital copies of this document online or through the USAES.

### Model Summary

- USAES developed the book and the book's included model in cooperation with engineers and contractors from ERDC-CERL.
- Book's purpose was make up for the widely used SWEAT Model by providing more technical information on categories and giving commanders tools to execute recon and repair
- Although classified FOUO due to propriety photographs and figures, the manual gained distribution throughout military and diplomatic engineering units
- Along with the NTC and USMA models, this book supplements the doctrinal SWEAT Model and its categories
- Expanded the use of the term infrastructure reconnaissance (IR)

### The SWEAT Model

#### The Infrastructure Assessment and Survey Model

Year: 2006

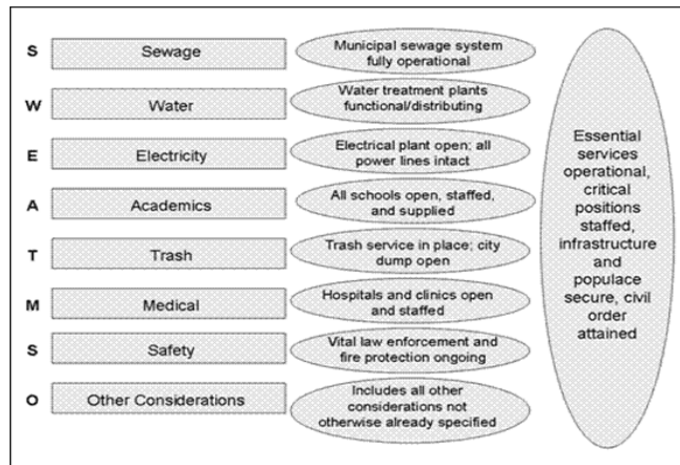


Figure 24: The Infrastructure Assessment and Survey Model aka SWEAT Model<sup>162</sup>

### Model Summary

- Officially known as the Infrastructure Assessment and Survey Model
- Referred to as "SWEAT" Model by most units and essential services practitioners
- Initial Model Concepts designed in 2004 by NTC and the Army Engineer School
- Used in Iraq since 2005
- Outlined in doctrine FM 3-24 since 2006, FM 3-07 since 2008, and FM 3-34.170 since 2008
- Tracked by GAO audits since 2005 in Iraq and Afghanistan
- Popular model still in use by many units as of 2010
- Figure 24 shows one of the most popular interpretations of the model when applied to stability ops

<sup>162</sup> FM 3-07, Figure 4-2, 4-11; see also FM 3-34.170, C-1.

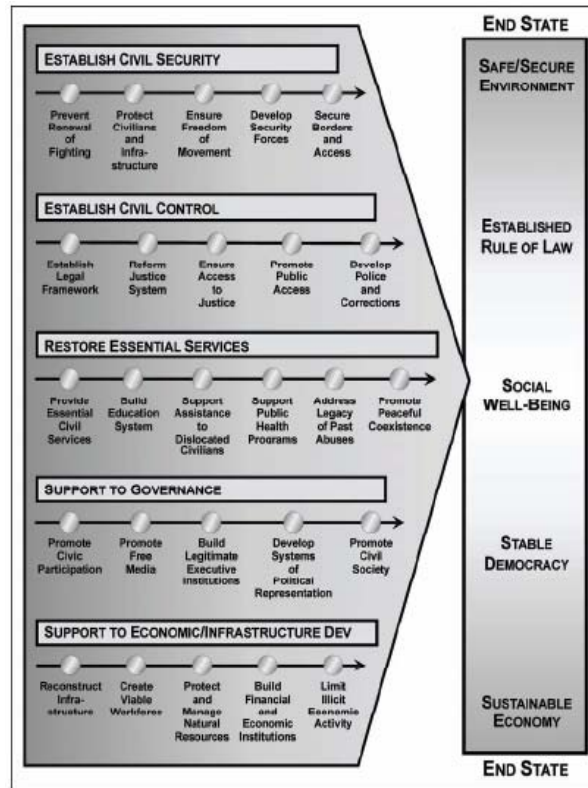


Figure 25: Restoration of Essential Services Line of Effort (LOE)<sup>163</sup>

### The Factor-Precedence Model Holistic Restoration of Essential Services V 1.0

Year: 2010

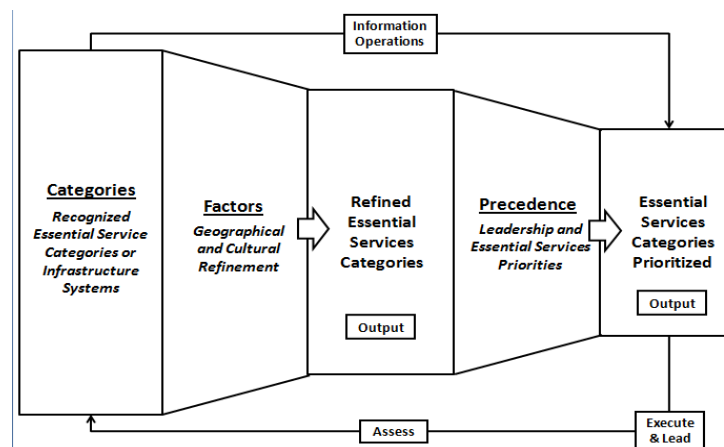


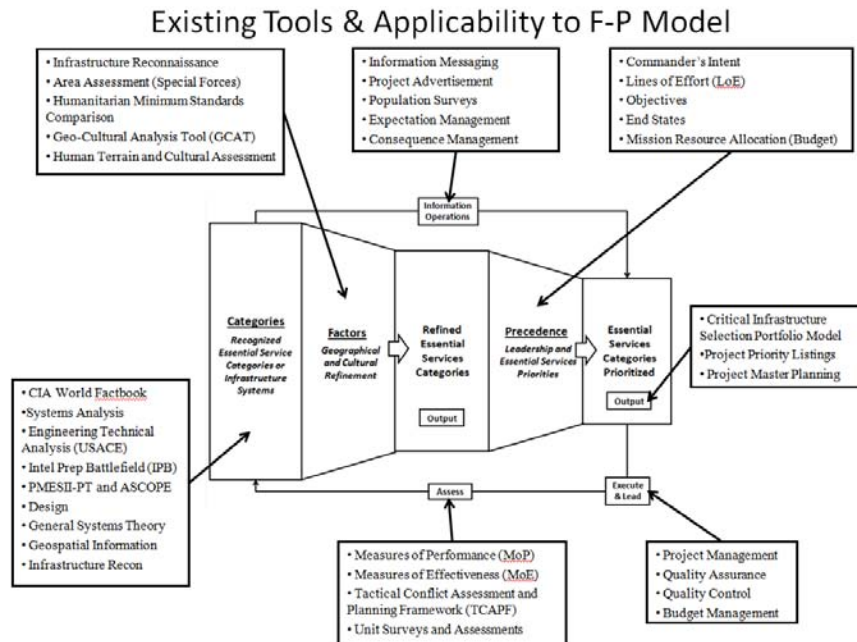
Figure 26: Proposed Factor-Precedence Model<sup>164</sup>

<sup>163</sup> FM 3-07, Figure 4-1, 4-10.

<sup>164</sup> Author's Note: Proposed in late 2010, the Factor-Precedence Model walks practitioners through geo-cultural screening of infrastructure categories then helps establish prioritization for execution.

## Model Summary

- Based on Infrastructure Assessment and SWEAT Models currently in use
- Focused on holistic and repetitive evaluation of critical categories
- Developed to integrate execution, leadership, and assessment into model
- Tailored by Area of Operation (AO) at any military level
- Tracked partially by past and current GAO audits
- Used in various forms by units in Iraq
- Compatible with doctrine and with many existing planning, intelligence, engineering, and analysis tools, see Figure 27



**Figure 27: Factor-Precedence Model Interaction with other Military Tools & Programs**<sup>165</sup>

<sup>165</sup> Author's Note: As outlined earlier, the Factor-Precedence Model is a way to develop reflection and prioritization on essential services restoration within the context of existing environments and tools.

## Appendix 5: How to Apply the Essential Services Factor-Precedence Model

This appendix provides a detailed description of the steps of the Factor-Precedence Model.<sup>166</sup> Figure 28 presents an overview of the Factor-Precedence Model aligned with its complementary tasks of information operations, execution, leadership, and assessment.

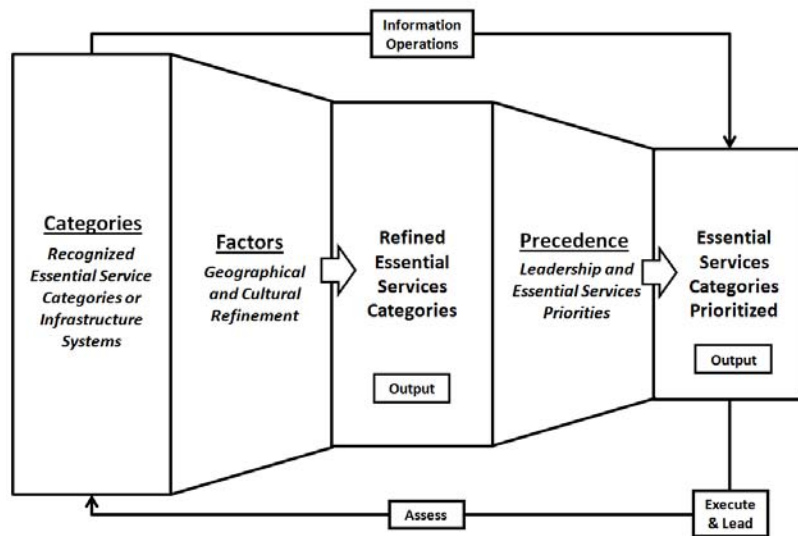


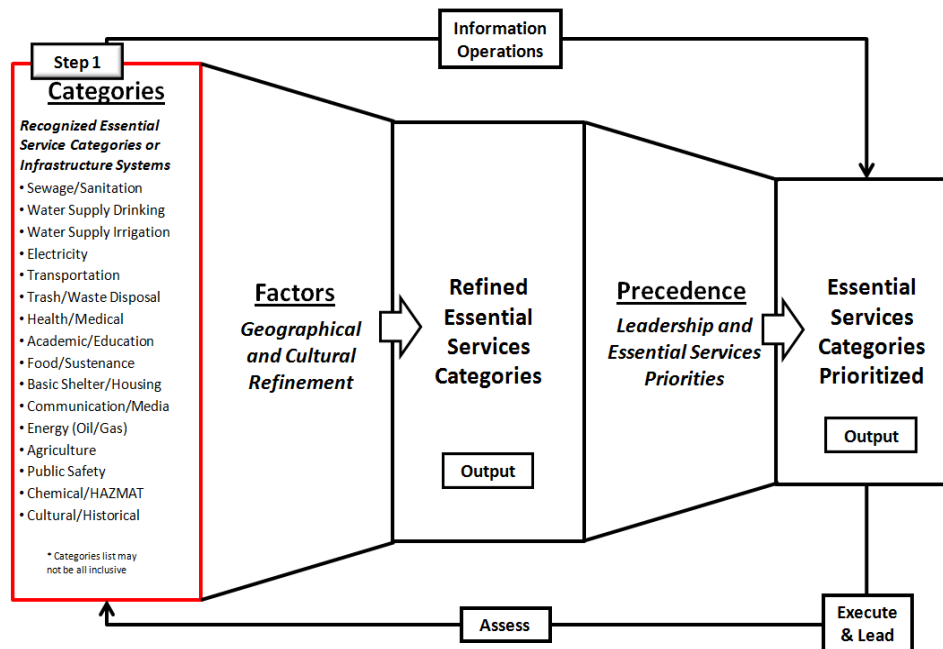
Figure 28: The Factor-Precedence Model

### Step 1: Form the Foundation using Recognized Essential Service Categories or Infrastructure Systems

The first step in the Factor-Precedence Model requires units to analyze the sixteen globally-recognized essential services categories that are needed to support basic needs for a culturally acceptable quality of life. The establishment of common categories forms a solid baseline for intelligence preparation, planning, and government engagement along bureaucracy lines. Because of widespread use and existing tools, most military units and leaders understand the categories and can ascertain initial requirements for action.<sup>167</sup> Figure 29 presents the categories identified in the first step of the Factor Precedence Model.

<sup>166</sup> Precedence Defined: See Appendix 1. The condition of being considered more important than someone or something else; priority in rank. The right to precede in order, rank, or importance; priority.

<sup>167</sup> FM 5-0, 1-5 and C-7. Operational variables, PMESII-PT, and civil considerations, ASCOPE, represent tools that allow commanders to understand and visualize the battlefield.



**Figure 29: Step 1 of Factor-Precedence Model – Essential Service Categories**

Table 7 provides a summary of the sixteen essential services categories identified and assessed during step 1.<sup>168</sup>

**Table 7: Essential Services Recognized Categories**

Essential Services Category	Purpose/Description
Sewage/Sanitation	Provides wastewater treatment to replicate the natural cleansing process by containment and treatment of water-saturated waste.
Water Supply - Drinking	Provides water at adequate pressure for use in residential or industrial applications. In short term situations, appropriate quantities of treated water may meet health requirement.
Water Supply - Irrigation	Provides certain non-potable water sources as irrigation for crops; may convert to drinking water sources after treatment.
Electricity	Provides the production, distribution, and consumption of electricity for light, information technology (IT), heating or cooling, and industrial production. Most industrialized or IT-based societies require power to function and regain footing.
Transportation	Provides waterways, roads, bridges, airports, and railroad networks to move goods and people and conduct military operations. The movement of goods and people is crucial to the functioning of civilian and military operations. The bulk of the populace and the economic activity will use street systems to support automobile traffic, commercial traffic, and public transportation. Road networks also prove essential for law enforcement and emergency response.

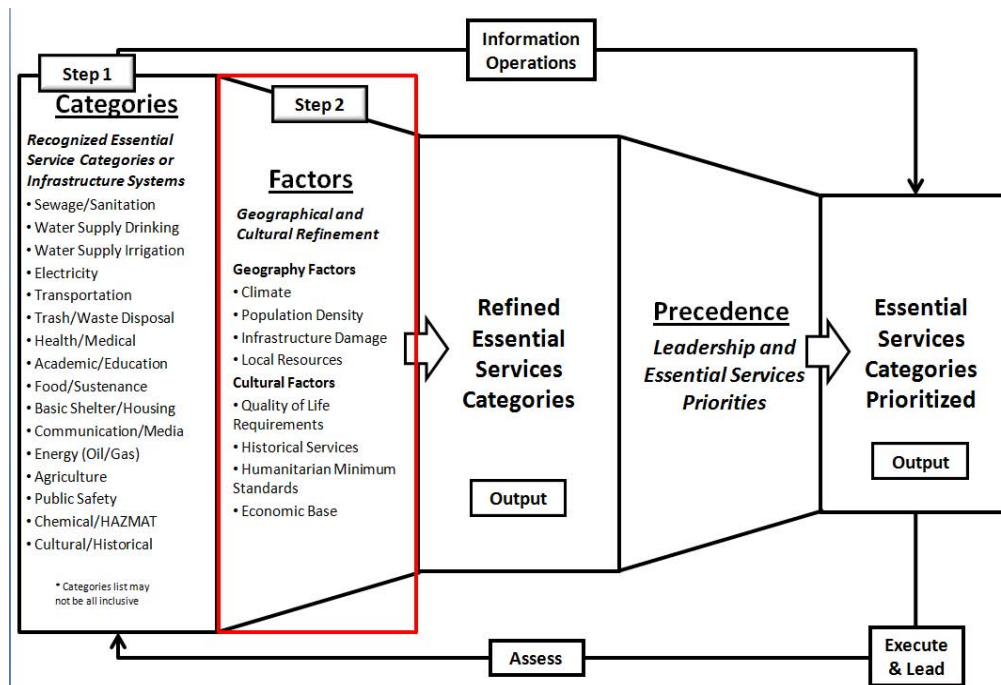
<sup>168</sup> *SWEAT Smart Book*, 1-52. The book dedicates considerable time to providing a comprehensive outline of each essential services category. Each category had detailed descriptions, system explanations, and reconnaissance forms for practitioners. Table 7 provides a summary of key elements of each category as they integrate into the Factor-Precedence Model. For additional information, see the *SWEAT Smart Book*. The *SWEAT/IR Book* also goes into considerable detail on each category.

Trash/Waste Disposal	Provides for transportation and disposal of wastes, ranging from municipal garbage to industrial wastes, in a controlled manner to ensure public health and safety. May sometimes include hazardous substances.
Health/Medical	Primary purpose: Provides short and long-term health needs of a population. Secondary purpose: Provides emergency response capabilities which are maintained and coordinated with other agencies.
Academic/Education	Provides the activities of educating, instructing, or imparting knowledge or skill. Usually refers to the physical infrastructure and supporting services that allow educational requirements to take place.
Food/Sustenance	Provides nutrients in solid form that sustain growth, furnish energy, and maintain life; a basic human need.
Basic Shelter/Housing	Provides public housing, private housing, commercial buildings & structures, and governmental buildings & structures.
Communication/Media	Provides for the flow of information between people and institutions. Essential to the proper functioning of a society and becomes progressively more important as the society becomes more developed.
Energy (Oil/Gas)	Provides all power sources required for an industrialized or IT-based society to function or for developing countries to become industrialized or IT based, heat production for warmth and food preparation, electricity for light, heating or cooling, and industrial production, and internal combustion for either industrial purposes or vehicle operation.
Agriculture	Provides a wide range of industries to include livestock, orchards, aqua farming, and traditional planted crops. Performs functions of food sourcing and economic strength.
Public Safety	Provides organizations and institutions that are employed to save lives and property in the event of an accident, natural disaster, or terrorist incident, and to ensure that good order and discipline is maintained. Includes police, fire, rescue, emergency medical services (EMS), and prisons per NTC <i>SWEAT Smart Book</i> .
Chemical/HAZMAT	Provides products that are essential to [a state's] economy and standard of living such as fertilizer for agriculture, chlorine for water purification, and polymers that create plastics.
Cultural/Historical	Provides places of worship; also includes locations of historical or cultural significance. Such locations often generate strong emotional sentiments among various groups and can carry significance in terms of collective images of self, sources of great and often times competing pride, and may serve as physical manifestations of a populations' identity.

## Step 2: Refine the Categories using Geographical and Cultural Factors

The second step of the Factor Precedence Model is to refine the essential services categories by applying eight local geographical and cultural factors, as presented in Figure 30 and Table 8. The output of this step is four to seven refined categories that represent the local population's needs and are at actionable levels for counterinsurgents. Units may refine geo-cultural factors with tools such as area and infrastructure assessments, Engineering Research and Development Center's (ERDC's) Geo-Cultural Analysis Tools (GCAT), and Human Terrain System assessments based on local engagements.<sup>169</sup>

<sup>169</sup> Dan A Morrison, *Geo-Cultural Analysis Tool™ (GCAT)*. Remarks and presentation delivered at the U.S. DoD Modeling and Simulation (M&S) Conference in Orlando, FL on March 10, 2008. Champagne, IL: U.S. Army Research & Development Center (ERDC), 2008, 26. In 2008, ERDC proposed a complete Geo-Cultural Analysis Tool (GCAT) to "put people back into the picture, put socio-culture in its place on the map."



**Figure 30: Step 2 of Factor-Precedence Model – Geo-Cultural Factors**

Table 8 provides a summary of the eight geo-cultural factors identified and assessed during step 2.

**Table 8: Factor-Precedence Model Geo-Cultural Factors**

Geographical Factor	Description
Climate	The five primary climate zones, Tropical, Dry, Temperate, Cold, and Polar represent the 30-year characteristic conditions of an area in terms of air temperature and precipitation. Seasonal shifts are also considered.
Population Density	Urban populations comprised of 2,500 or more people living in a single area often show typical built-up conditions and industrialization. Populations not classified as urban compose the rural population. Urban populations require more focus on sewage and trash services due to health requirements in close quarters. Rural populations often focus more on irrigation water and transportation to facilitate farming and trade. Density factors may also guide prioritization of assisting more people. <sup>170</sup>
Extent of Damage to Infrastructure	Violence and infrastructure damage often come before or result from counterinsurgency operations. Measuring the extent of damage resulting from conflict can help counterinsurgents provide a visual means of restoring essential services.
Local Resources Available	Construction and management capabilities, raw materials, and host government capacity to manage services make up the most important local resource factors to improve essential services. This factor may also describe allocation of unit resources like money, personnel, or training that prove critical to restoration efforts.
<b>Cultural Factor (needs, desires,</b>	<b>Description</b>

<sup>170</sup> Jeffrey Herbst, *States and Power in Africa: Comparative Lessons in Authority and Control* (Princeton, NJ: Princeton University Press, 2000), 45.



expectations)	
Cultural Environment	Quality of life requirements determine the critical needs of the populace and differ in every culture based on the culture's individualism and religious focus. According to Hofstede, individualistic cultures require more personal support, and collectivistic cultures require more support to the tribe, group, or organizational culture. Religion also plays heavily into the cultural context in many areas around the world. <sup>171</sup>
Historical Services Standards	Historical service standards provide an important factor that dictates the essential services expectations of people in the area. Past performance and services of great expectations manage the people's expectation and needs. Flows from the level of development experienced by the area. <sup>172</sup>
Humanitarian Minimum Standards (United Nations)	Based on Maslow's Hierarchy of Needs and basic medical information, the United Nations developed the basic requirements for sustaining the lives and dignity of those affected by calamity or conflict. The Minimum Standards which follow aim to quantify these requirements with regard to people's need for water, sanitation, nutrition, food, shelter and health care. <sup>173</sup>
Economic Base	The growth, decline, or stagnation of the local community rests upon basic economic activity, which integrates local needs and sustains buying power. Agricultural, market, service, and production-based economies are affected most heavily by this factor.

### Step 3: Establish Precedence using Leadership and Essential Services Priorities

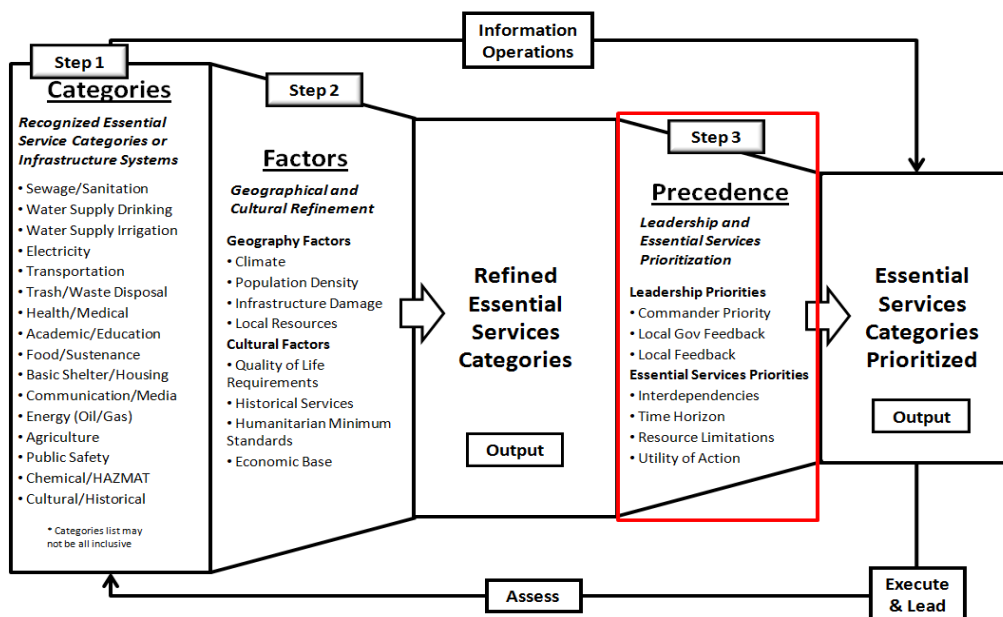
Using the refined categories from the second step, the third step in the Factor-Precedence Model allows units to apply leadership and essential services priorities, as shown in Figure 31 and listed in Table 9, to rank order essential services operations and projects. The output of this step is a final prioritization that governs specific actions within categories and within individual projects to ensure effective and efficient execution of area essential services operations. Adjustments to funding, resources, or commander's intent can shift the precedence of refined categories. Due to the long-term nature of essential service operations, units should keep adjustments to the minimum necessary.

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<sup>171</sup> Hofstede, 21.

<sup>172</sup> Maslow, 195; Malinowski, 23.

<sup>173</sup> The Sphere Project, *Humanitarian Charter and Minimum Standards in Disaster Response*. (Oxford, England: Oxfam Publishing, 2004), 16.



**Figure 31: Step 3 of Factor-Precedence Model – Precedence Elements**

**Table 9: Factor-Precedence Model Leadership and Essential Services Precedence Elements**

Leadership Priorities	Description
Commander Priority	Commander priority provides a critical element that leverages leadership guidance and mission focus. Planners must meet the Commander’s Intent by implementing his prioritization while ensuring that actions nest with higher headquarters priorities. Maintaining consistent priorities in essential service assists in consistent growth and improvement.
Local Government Feedback	Local government feedback incorporates local leadership’s assessments and existing plans. The integration of the government’s funding, operations, and maintenance capability into restoration activities proves critical into understanding individual and Group needs. <sup>174</sup>
Local Population Feedback	Local feedback in terms of surveys and assessments provide a relative perspective on what they desire or want. Understanding the local feedback helps build prioritization before action and helps inform messages needed during and after execution. <sup>175</sup>
Essential Services Priorities	Description
Interdependencies	Systemic connections between essential services have synergistic effects when critical nodes either improve or decline. Interdependence, described as the “Tailored Network” of related services by 2/25 Stryker Brigade Combat Team, informs critical categories and helps pinpoint critical projects. <sup>176</sup>
Time Horizon	Time horizon balances the short and long-term needs with the operational timeframe of the unit. Certain categories, like electricity, have long-term impacts and have long-lasting projects. Practitioners should also be aware of connections

<sup>174</sup> Maslow, 195; see also Hofstede, 21.

<sup>175</sup> Skinner, 1-26; see also Gorkowski, 45.

<sup>176</sup> Kilcullen, 16.

	between long-term projects and short-term projects. Again, electricity provides an example with long-term projects in power production needing connection to short-term projects like power sub-stations. Without a systematic connection between projects, power produced would never make it to the end user. Essential services short-term fixes must maintain balance with long-term effects. <sup>177</sup>
Resource Limitations	Unit resources such as budget, personnel, and technical expertise, may limit certain actions while facilitating others. Specific budget cut lines may adjust priority of individual categories and specific projects during resource constrained periods. <sup>178</sup>
Utility of Action	The utility of each balances the cost-benefit analysis, or bang for the buck, with the requirements to fairly meet essentials service needs. <sup>179</sup>

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<sup>177</sup> SWEAT Smart Book, 3-5.

<sup>178</sup> Ibid.

<sup>179</sup> Skinner, 1-26; see also Gorkowski, 45.

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